

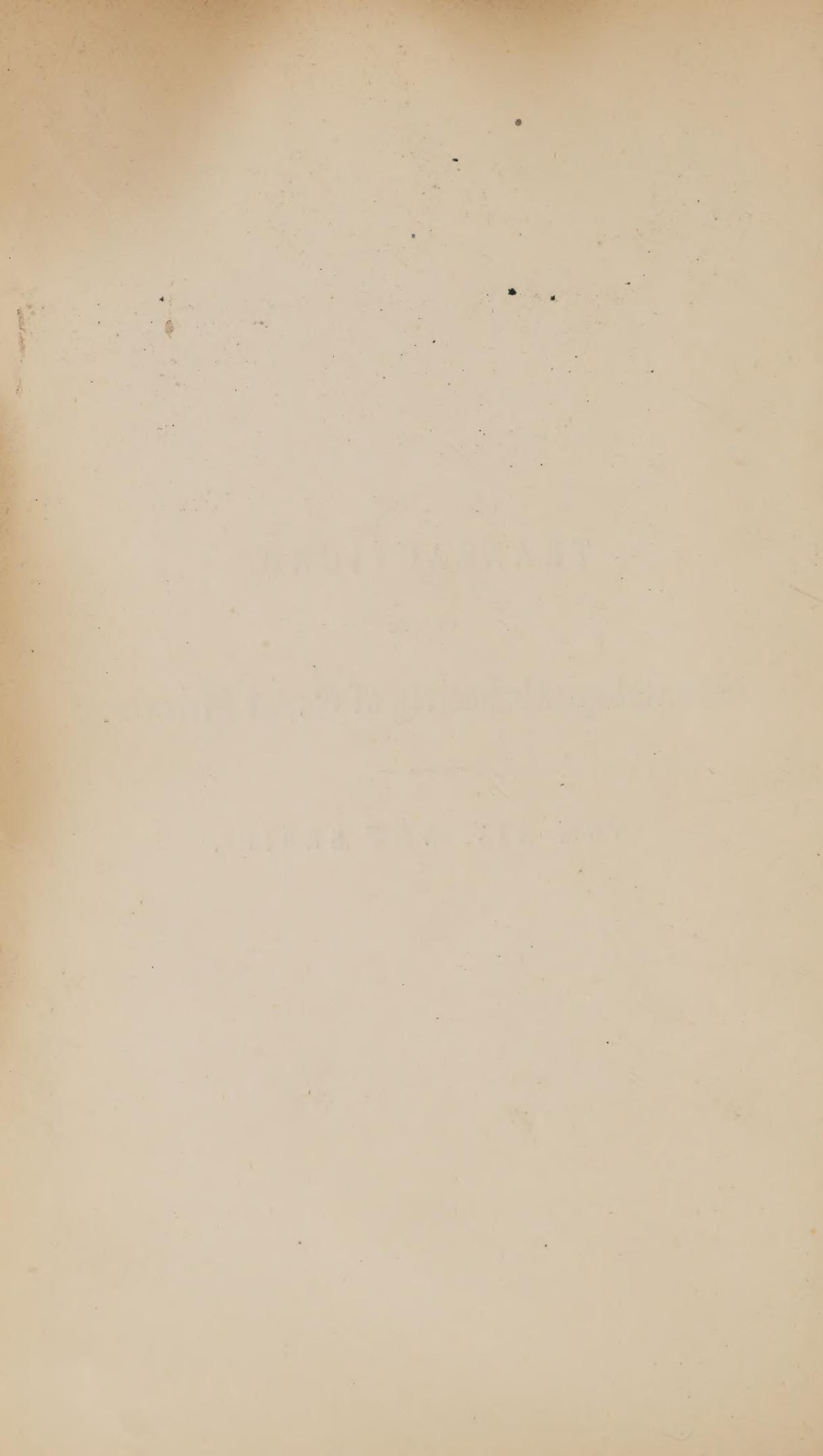
TRANSACTIONS

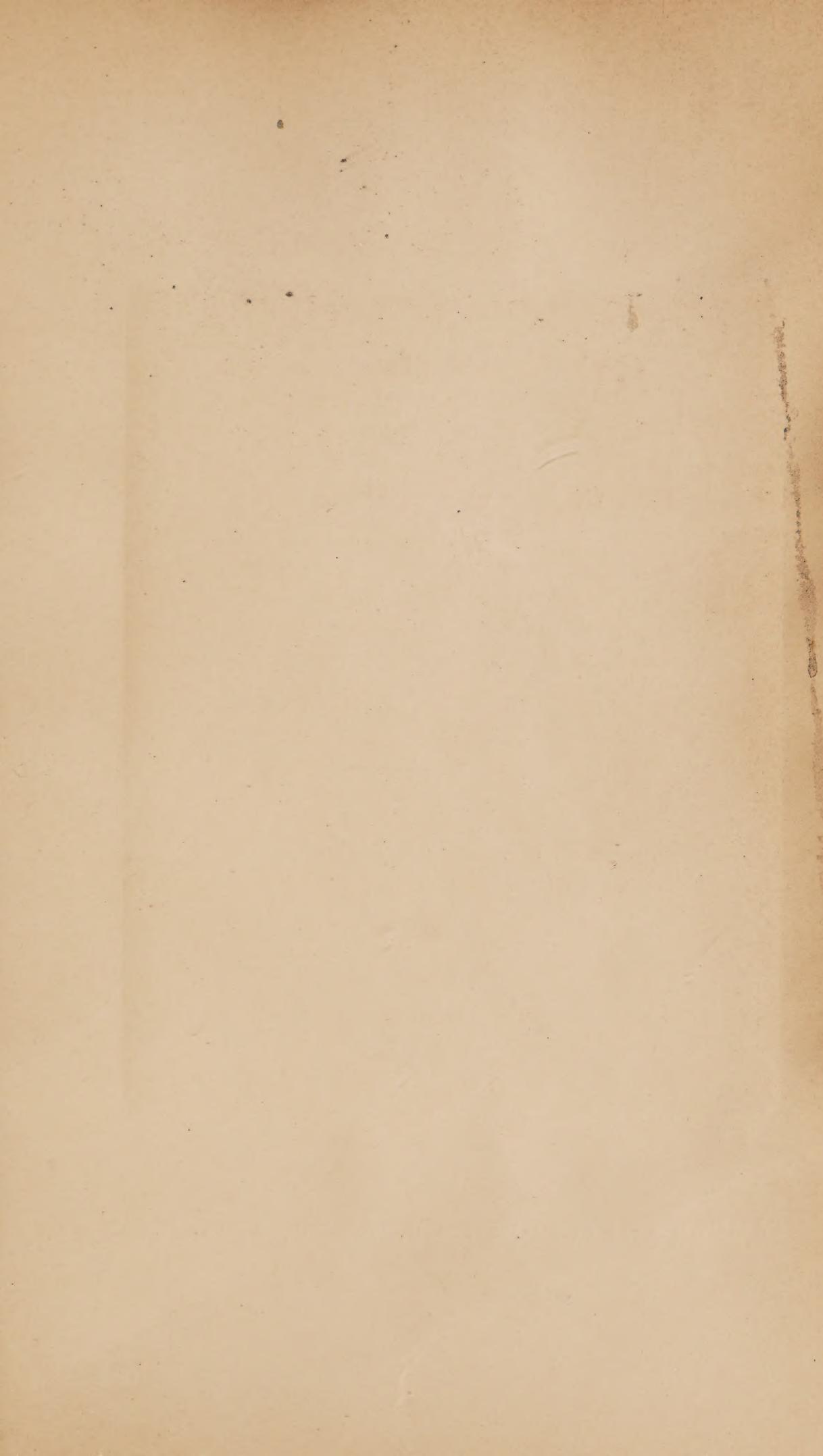
OF THE

Odontological Society of Great Britain.



VOL. XIV.—NEW SERIES.







*Woodburytype.*

SAMUEL CARTWRIGHT, F.R.C.S. ENG., L.D.S. ENG.



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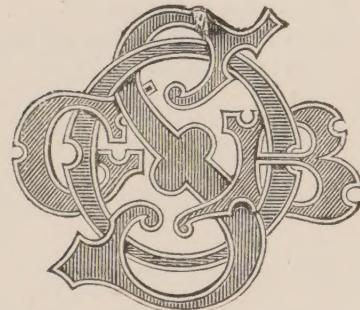
# TRANSACTIONS

OF THE

# ODONTOLOGICAL SOCIETY

OF

# GREAT BRITAIN.



VOLUME XIV—NEW SERIES.

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1882.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*November 7th, 1881.*

THOS. A. ROGERS, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes having been read and confirmed,

The PRESIDENT announced that an old and valued member of the Society, Mr. David Hepburn, of Edinburgh, having been obliged to retire from practice owing to serious ill-health, the Council proposed that he should be elected an Honorary Member, and he felt sure that this suggestion would be approved of by the members generally.

He also announced that the following gentlemen had been duly nominated for election, and would be balloted for at a subsequent meeting, viz., Messrs Thos. Henry Powers, of Walton-on-Thames, and S. Atkinson, of 4, Largo St. Fernando, Naples.

MR. J. C. FORAN signed the Obligation Book and was formally admitted to membership by the President.

MR. A. WOODHOUSE then rose, and moved the following resolution :—

“ That the thanks of the Society be given to the President for the great munificence and liberality displayed by him in defraying all the expenses of the entertainment given by him on behalf of the Society during the time of the Congress, and that the thanks of the Society be also given to Mr. Saun-

ders for his delightful entertainment." He might say that when the matter was first discussed it was very much the wish of the Council that the Society itself should bear the expenses of the conversazione, but the President expressed so strong a wish to be allowed to take the whole cost and responsibility on himself, that at last the Council felt obliged to give way. Mr. Rogers carried out all the arrangements in a most liberal spirit, and members could not but feel proud that the Society had been so well presented to the notice of our foreign guests. Mr. Saunders had also given a most delightful entertainment at his country house, and had done much to give our visitors a highly favourable impression of English hospitality. He thought, therefore, that he also fully deserved their thanks.

MR. COLEMAN said he had no need to add anything to what Mr. Woodhouse had said, indeed it was a purely formal duty for him to second such a resolution at all, since he felt sure it would be carried by acclamation as soon as read.

THE PRESIDENT said he had been taken unawares by this resolution, but he thanked the Society for it. He had opposed the expenditure of the Society's funds for the purpose of the conversazione, because he held that they should be devoted entirely to scientific objects and not to such as this. It was true that the Council hesitated at first, but ultimately they allowed him to have his way, and he took it as a great compliment that the Council had thus shown their confidence in him. He was very pleased to hear that the arrangements he had made had given general satisfaction, and he hoped that if he omitted to send invitations to any who ought to have received them, that the omission would be excused.

MR. S. J. HUTCHINSON announced that numerous additions had been made to the Museum during the four months which had elapsed since the last meeting. Mr. Felix Weiss had contributed a number of very interesting specimens, Mr. Forsyth had presented some very curious old instruments, and other donations had been received from Mr. Henry Sevill, Mr. Brunton, of Leeds, and Mr. Lyddon, of Reading. He was

happy to be able to state that good progress was being made with the new catalogue, which was rapidly approaching completion.

MR. MUMMERY showed the skull of a Fingo which presented some points of interest from an odontological point of view. The worn state of the teeth showed that it was the skull of an old man, yet all the teeth were perfect and there was not a trace of caries. In the next place the left upper third molar was absent, a somewhat unusual occurrence amongst savage nations, in whom the wisdom teeth were generally large and well developed. The Fingoes were a race inhabiting the south-west of Africa, and in an investigation which he had made some years ago, he had met with a few similar cases of absence of wisdom teeth amongst the West African negroes. On the other hand, he had met with some cases amongst the Ashantees in which a fourth molar was present in the upper jaw.

To an enquiry from the PRESIDENT as to whether he would be willing to present the specimen to the Museum,

MR. MUMMERY replied that he should be very pleased to do so. He was sorry to say that the Museum was at present very deficient in ethnological specimens, and he hoped the present Curator would do his best to improve that part of the collection.

MR. LAWRENCE READ showed an improved flask and clamp for vulcanite and celluloid work, the details of which had been worked out by Mr. A. Howarth, of Bradford, a former student of the hospital. Mr. Read said he had used it himself for the last six months, and had found it work very satisfactorily.

MR. CHAS. TOMES showed a very large odontome which had been removed by Mr. Christopher Heath from the mouth of a young lady 18 years of age. When she first came to Mr. Heath, in May last, there were no molars in the lower jaw on the right side, but it was said that one had been extracted some time previously. There was then great

enlargement of the bone in the molar region, and a fungus-like growth projecting into the mouth from the alveolar process, the appearances closely simulating those of sarcoma of the jaw. The patient not being in a favourable state of health for an operation, Mr. Heath recommended a change to the sea-side. On her return the swelling had somewhat diminished, and a fistula had formed on the alveolar ridge, which appeared to lead down to bare bone. Mr. Heath accordingly proceeded to remove the supposed sequestrum, and after some trouble succeeded in extracting this mass. After the operation, which took place in September, the patient was at once relieved, and the jaw had nearly returned to its proper size. The odontome itself was a very remarkable one; it measured  $1\frac{1}{2}$  in. by  $1\frac{1}{4}$  in. and weighed 315 grs. It consisted of a confused mass of dextrine, with small portions of enamel here and there. Notwithstanding its unusual size, he was inclined to think, as the result of his examination, that it was the product of a single tooth germ which had gone wrong and not of several. Mr. Heath had presented half of the specimen to the Museum of the Royal College of Surgeons, and the other half to that of University College, but he had kindly allowed a thin section to be taken out of the middle for the Society's Museum, and this would be sufficient to give a good idea of its size and structure.

Mr. Heath had also drawn his attention to a remarkable case of cystic tumour of the jaw which had been published by Dr. Bryk, of Krakaw. The patient was a man aged 32, and from the history and appearance of the jaw, it was supposed to be a slowly growing cystic sarcoma; but on microscopical examination it was found to be composed of an immense number of cavities bounded by connective tissue investment and lined with columnar cells, the residual space being filled with a stellate reticulum. It was, in fact, an enamel organ which had remained uncalcified and had proliferated to an enormous extent.

MR. TOMES showed also, as being a kindred specimen, a

very large odontome from the elephant, which belonged to the Society's Museum.

The PRESIDENT asked whether Mr. Tomes had found any traces of cementum in Mr. Heath's odontome?

MR. TOMES replied that he had not, though some of the dentine was of so coarse a structure as scarcely to differ from cementum in appearance.

The PRESIDENT then called upon Dr. B. W. Richardson F.R.S., to read his paper on the "The Causes of Caries, Constitutional and Local."

*On the Constitutional and Local Origins of Caries  
of the Teeth.*

By BENJAMIN RICHARDSON, M.D., F.R.S.

If any of the members of this Society should find it worth their while to spend one or two leisure days at Hythe, in Kent, they would do well to visit a crypt in the church and inspect a number of skulls which for an immense period of time have been preserved there. They will be told a story that these skulls were left after a battle fought fourteen centuries ago by Vortigern, which story they may or may not accept according to their faith in traditional record. They will find no question, any way, that the skulls and other remains of skeletons of men and women have been there at least for centuries, for they will discover that in 1714 Daniel Defoe describes them in his journey, and states that in his time they had long been carefully preserved.

I once devoted a week to the study of these skulls, and was able to divide them fairly into certain racial forms; some seem to me of the Keltic division of the great Indo-European family, others Teutonic (Angles and Scandinavians), and others—Roman or classical. But that which is of most importance to my present subject relates to the teeth. A great many teeth have been removed

from the skulls, and many skulls are toothless, but this is a fact that amongst all I fail to find an instance of a carious tooth. It is possible that with all my care I may have overlooked a tooth of this kind, but it is quite certain that anything like caries is exceptional there ; and the tradition is that all the teeth were sound. There are modifications of the teeth, some are ground down very much, and in instances, in which the skull was obviously that of a very aged person, there is atrophy of the alveolus, but the particular disease we, in these days, call caries does not, according to my observation, appear.

In the present stage of our civilization in this country, caries is of all others, I presume, the predominating disease affecting the teeth. For several years past I have introduced into my tabulated clinical records a section of enquiry respecting the condition of the teeth, the result of which enquiry has startled me not a little.

The returns would show that over 80 per cent. of adults are suffering from caries in one or other tooth, the returns including, from the time since I commenced to make the observation, 4,000 persons of different age and sex. I doubt not but that your hospital records would show the predominance of caries over all the other diseases pertaining to the teeth, and that this disease forms the basis of the large majority of your

various operative procedures. I think I might go even a step further. I think I might venture to predict that few of you, in the course of your experience, have many times met with the two sets of teeth in the same person free, altogether, from carious disease.

The study of caries, therefore, is indeed more than mere professional study, it is practically national, and in this respect its importance seems to be most worthy of consideration, for I think I observe that the affection is more decidedly marked in the young than it was in the beginning of my career as a practitioner, that is 32 years ago. I would not press this opinion in its bearing upon all classes of the community, but I feel convinced as to its soundness in regard to the wealthier classes. I have seen of late years what I do not remember to have witnessed before, caries extending through the whole of the deciduous teeth followed by the development of a second set of teeth especially prone to follow the same course of destruction. For the general development of disease in this manner we are bound to look for general causes, as apart from local, pure and simple. The local causes need not be and ought not to be ignored, for without doubt they tend to bring out every affection which has a deeper or constitutional origin, but we must keep the local causes in their true places, as secondary in respect to the result.

## CONSTITUTIONAL ORIGINS OF CARIES.

Let me touch, then, in the first place, on certain of the constitutional or deep-seated causes of caries, on those which we may consider hereditary in character, as a general rule, with exceptions in which the cause is due to some development of disease in the earliest life of the person affected.

*Syphilis and Caries.*—If my experience be correct the most common constitutional cause of caries is the constitutional malady syphilis, and I almost fear that the general prevalence of the carious affection is largely from this origin. My learned and esteemed friend Professor Gross, of Philadelphia, dwelling on the prevalence of syphilis in civilized countries, declares a condition which I would hardly have dared to depict, but which after reading again and again, I must not hesitate to confirm. He says, “it may be assumed that the disease is of gigantic proportions,” and, speaking of his own country, “that it exists in many of the best and noblest families of the land: that since the establishment of railway travelling it has penetrated every rural district, and that it is poisoning, and slowly but surely undermining the very fountains of life in every direction, sowing the seeds of death among our people and gradually deteriorating the national health. It is no slander to assert that many of the cases of the disease brought under the notice of the

practitioner occur in the higher walks of life, among married as well as among single men. Out of a population of 40 millions, the present number of inhabitants in this country (U.S.A.), it is safe to assert that nearly 2 millions are at the present time affected with the syphilitic virus. This estimate tallies very closely with that of Dr. Holland, of the number of syphilitic subjects in the United Kingdom of Great Britain, and what is true of that country may fairly be assumed to be true of our own."

I knew Dr. Holland well, and have no doubt as to the correctness of both his and Professor Gross' conclusions, but it must be remembered that the figures above quoted, while they give one in twenty of the two great civilized countries as suffering from this infectious disease, afford but a partial reckoning of the whole of the sufferers. These referred to are mainly adults, who may be considered as not making up more than two out of five of the whole population, so that we have to take into account their offspring as well as themselves, and we have to connect with this account the solemn question whether any of the offspring of persons infected, previous to the begetting of that offspring, can be free from the taint. For my part I doubt if one can be considered free. Dr. Gross evidently entertains the same opinion, although he does not express it in

the same words, for he adds “ after these appalling figures, can one wonder at the enormous rate of infantile mortality which pervades London and other large cities of the old and new world ? Like apples which rot upon the tree before they are ripe, the children of these infected persons drop dead from their mother’s womb, or if they are born alive perish soon after birth.”

I noticed in 1859 the relation of syphilis to caries, and the hereditary tendency to the disease that is engendered by it. I then showed that of 88,784 children dying annually in England from all causes, 255 die from syphilitic disease. I noticed then also that the peculiarities of the syphilitic disease referring only to its secondary effects were first, that it acts generally by interfering with the nutrition of all parts ; and secondly, that it leads to special derangement of nutrition in the osseous and fibrous textures of the body. I said then, what twenty-two years of later experience and observation have fully confirmed, that syphilis, contracted in adult life, and following its usual courses, does not materially affect the dental structures of the person who has contracted the disease. I drew a distinction at that time between the effect on the teeth produced by the specific disease and the effect produced by the medicine then so fully used to cure it, viz., mercury, and I indicated that the medicine, not the disease, was

the cause of the destruction. The time which has elapsed has enabled me to prove the correctness of that reasoning. I have lived long enough to witness an entire change in the use of mercury. In the first ten years of my professional life, salivation from mercury was a phenomenon I very frequently observed. For many years past I have never seen an instance of it, and I believe it to be almost unknown. It is therefore open for me to state that the disease of the teeth of a carious character which at a former time so often occurred after an attack of syphilis was mercurial necrosis, as distinguished from syphilitic caries.

The fact remains all the same that the hereditary constitution left by syphilis is indicated in the next generations in disease of the teeth, and in a constitutional state in which caries is easily developed.

*Dyspepsia and Caries.*--After syphilis as a constitutional cause of caries, I should place, on the constitutional side, dyspepsia. There are some, perhaps, who would give this the first position, and I am quite prepared to admit that it is very difficult to say which is most important. The dyspepsia that tells with greatest effect for evil is that which is induced in the first months of life by improper feeding, and especially by the use of artificial foods instead of natural breast milk. If we could go back to the early history of those people who yield the

dead evidences of first rate dentition at Hythe, we should discover, I take it, as the prime cause of preservation of the dental tissues freedom from the specific disease, with the fact that the mothers of those primitive times nursed their own offspring, and were themselves simply but efficiently fed. It is the same amongst primitive peoples at the present time. One of my patients who for nearly twenty years acted as a missionary on an island of the Southern Hemisphere, told me, when I enquired of him on the point, that the decay of teeth there was of the rarest occurrence, and that natives who were actually cannibals before they were touched by the footsteps of civilization had teeth the most perfect in regard to development and permanency.

I once concluded that the tendency to caries developed from dyspepsia was always and only developed during the period of infancy. I still think that this is the most common time for the commencement of the evil, the time I mean of exposure of the deciduous, and development of the permanent teeth. The child deprived of the natural nutrient food, so admirably apportioned in all its parts, and supplied instead with haphazard nourishment which its stomach cannot digest and its body cannot assimilate, is subjected generally to a condition in which the tissues are imperfectly constructed. It may retrieve in after life some of the

harm inflicted upon it in the growth of those tissues which continue to undergo destruction and reconstruction. But with such structures as the teeth, made as we may say for the whole of life in a few short and critical months, the perfection is impossible if the start be bad. Thus it happens that children imperfectly nourished in their earliest months of life shed their deciduous teeth as a carious slough, or little better than that, and cut a second set which are very poor improvements upon the first.

*Struma and Caries.*—A great deal has been said respecting the influence of the strumous or scrofulous and tubercular diatheses on the teeth in relation to caries. I think that, specifically, more has been made of this connection than really exists. It appears to my experience that when syphilis as a predisposing cause is excluded, and when dyspepsia is excluded, the strumous or tubercular condition is not of necessity connected with caries of the teeth. The strumous are often tainted with syphilis, and the cross between struma and syphilis is one of the most perplexing of the intermarriages of disease the physician has ever to meet. The scrofulous and tuberculous are often dyspeptic, and dyspepsia in them is, again, one of the most troublesome affections for which the physician has to prescribe. But when these conditions are duly estimated it

is not, according to my observation, the fact that the teeth of the strumous are essentially worse or more carious than the teeth of other persons. I repeat, in fact, what I said in 1859, "The strumous or scrofulous diathesis has been treated of by most writers on dental surgery as one of the most common causes of caries, and the teeth of scrofulous persons have been specially described as small, of pearly whiteness, fragile, and ready to decay. In medical practice this disposition to dental mischief does not, however, come out so strikingly as might be supposed, nor do other diseases of the masticatory organs seem to the physician so simply dependent on struma as has been assumed. I doubt not that the practitioner of dentistry frequently meets with cases of strumous disease in which the teeth are specially implicated: the case therefore coming before him with all the marks of strumous disease prominent, he is led to connect the local disorder as an effect, to the strumous disorder as a cause. The physician, on the other hand, with his mind fixed on the general disorder, is often surprised to observe, amidst all the havoc which struma inflicts on its victims, how wonderfully the teeth escape. If we connect the disease phthisis pulmonaris with the strumous diathesis, the extent to which the teeth escape in the midst of surrounding evils is at once a remarkable and important fact. Amongst

the numerous cases of consumptive disease which pass before me in an Institution specially devoted to the treatment of that complaint, I do not remember a single instance in which there was any marked peculiarity ; such as would specify a constitutional derangement acting so as to affect the dental organism, either by *caries, necrosis, or atrophy.*"

*Eruptive Diseases and Caries.*—We had before us for controversy, at one time, the question whether the epidemic eruptive diseases of children exerted any marked influence on the secondary teeth leading to caries, in later life.

Dr. Chapin Harris, whose admirable book was for so many years a standard, took a prominent part in promulgating the hypothesis that odontotrophia, or atrophy of the teeth, with ultimate caries, was a somewhat frequent result or consequence of eruptive disease. He gives in his work a general history of 71 cases of atrophy which came under his observation during a period of 18 years. The following is the result of his enquiries.

In 38 cases the patients had had measles, and, as nearly as he could ascertain, some time during the formation of the enamel of the teeth. In six cases the children had had chicken pox ; in four scarlet fever ; in three, catarrhal fever ; in two, small-pox, and in one the mother had had an

attack of varioloid about seven or eight weeks previous to her accouchment ; but in this last case the atrophied teeth belonged to the temporary set.

With regard to the other 17 cases Dr. Harris was unable to obtain any reliable information. The cases, he adds, would seem to establish the fact that, although the affection is caused far more frequently by eruptive than any other form of constitutional disease, it may nevertheless occasionally result from other diseases. Dr. Harris further describes another form of atrophy, in which the whole or part of the crown of the tooth is affected, the dentine being often implicated as well as the enamel. This tooth,—according to his description, and it is a description of disease which one is constantly meeting with in dispensary practice,—usually has a pale yellowish colour, with a shrivelled appearance, and it is partially or wholly divested of the enamel. Sometimes the crown is not more than one-half or one-third its natural size. Its sensibility is usually very greatly increased, and its sensibility to pain from external impressions is wonderfully increased by acids. It is also more liable than the other teeth to be attacked by caries. The root of the tooth is sometimes, though rarely, affected, and presents an irregular, knotted appearance.

The disease is often confined to a single tooth,  
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but more frequently shows itself in two corresponding teeth in the same jaw, the bicuspids being more liable to the attack than the other teeth. The temporary teeth are rarely affected by it.

When I first quoted this passage from the learned author referred to, I ventured to differ from him, and again after a lapse of 21 years, I repeat the objection to his argument. I have no doubt as to facts which he adduced, but I feel certain that the evils he observed were not due to the eruptive diseases themselves; they were mainly due to the method of treating those diseases, so commonly practised in his time, by the use of mercurial preparations. I said originally, "That if these diseases are let alone or rather if they are not over treated, humanity is pretty well saved from their after effects in so far as the organs of mastication may be considered." I have had my eyes open since then, and they have conveyed to me no phenomenon of any kind that would lead me to withdraw a syllable from the quotation above stated. I have, it is true, seen caries in the young coming on after eruptive disease, in the treatment of which no mercury was used. I have a case of the kind under my care now; but in all such cases I have seen the other signs which declare also the specific taint of syphilis, and in the particular case I refer to there is no concealment of the taint.

Summing up, then, the constitutional causes of caries of the teeth, I should reduce them practically in these days to two in number, the hereditary taint of syphilis, and the occurrence of dyspepsia and consequent faulty nutrition during the time when the permanent teeth are being developed. These causes are at work sometimes singly, at other times in combination. Respecting the manner in which they act there is much that is in common with some points that are dissimilar. Mr. Jonathan Hutchinson, who most ably and truthfully drew out the first definite relations between syphilis and disease of the teeth, showed that the most frequent features of the syphilitic condition are the following : (a) smallness of teeth ; (b) notching ; (c) colour, which is a dirty grey ; (d) wearing down ; (e) confinement of these signs almost entirely to the incisors and canines. These symptoms only apply to the permanent set of teeth, according to Mr. Hutchinson, who accounts for this by supposing that the temporary set suffer less uniformly than the permanent, because the occurrence of syphilitic stomatitis and its complication with alveolar periostitis, to which the marring of the tooth is attributed, occurs during the first weeks of life, and when the temporary set of teeth are already well formed. Mr. Hutchinson gives two very decisive cases in which, during syphilitic stomatitis in infants, inflammation of

the alveolar periosteum, accompanied by exfoliation of the teeth, took place. These conditions of the teeth, which will be recognised by the dental profession as tallying very closely with what has been called atrophy of the teeth, are entirely distinct from caries, although such teeth are very liable to caries.

The opinions brought forward by Mr. Hutchinson, submitted to a committee of the Pathological Society of London, were in great measure confirmed by the committee. I look upon it that they may be accepted as representing in a very clear way, a very definite cause for a particular kind of dental disorder, though I would not agree with Mr. Hutchinson that a patient born syphilitic may escape from damage of the teeth altogether, if in infancy he escape stomatitis.

The syphilitic tooth, the tooth, that is to say, branded or impressed by the marks of constitutional disease, is not, as Mr. Hutchinson correctly says, a carious tooth. It is nevertheless the tooth that becomes carious, and it is quite a question whether, if the owner of it lives on to the average duration of life, it escapes the carious destruction.

In like manner the change which takes place in the developing tooth from dyspepsia is one attended with deficient development of structure. There is smallness of the teeth, there is either a dirty grey or a pearl like whiteness; there is often

irregularity, and there is wearing down. In so far these teeth tally with those that have been described by Mr. Hutchinson ; they differ in not being serrated or notched, and they differ in not being so specially confined to the incisors and canines.

### LOCAL ORIGINS OF CARIES.

I am brought now to the consideration of those local causes which, acting secondarily, call forth caries, and here I see, prominently, a question which your experience is most likely to fill up, which mine at this moment fails to fill, and which may be stated as follows :—

Given a person free from inherited taint, free from disease incident to dyspepsia in early life, free from every other constitutional influence, and possessed, in adolescence, of perfect sets of teeth, is there in our modern life any cause, short of direct accident, that will render the teeth of such a person carious ? In other words, can caries be attributed to purely local causes connected with habit or mode of life ?

You will, perhaps, demur, or will argue that there is strictly no clear line of demarcation between local and constitutional causes, and it may be well to consider briefly the two terms in relation to each other.

Our common phraseology supplies us with this division of diseases into local and constitutional,

long custom sanctions it, practice clutches it. Since the days, some 2,000 years ago, when the Father of History, travelling through Egypt, wrote "that one physician is confined to the study and management of one disease ; that some attend to disorders of the eyes, others to disorders of the head ; some take care of the teeth, others are conversant with intestinal disease, whilst many attend to the cure of maladies which are less conspicuous ;" from then until now, in the division of labour for the treatment of diseases, this classification of diseases has been accepted.

But if we take this subject into consideration on a higher ground, on philosophical argument, we shall find that the division of diseases into "local" and "constitutional" forms is arbitrary, and does not rest on close observation of nature. We shall find that the most local type of disease, local as regards place, position, and origin, lapses usually into constitutional derangement, more or less severe ; while in the majority of cases the origin of local disease is due to a preceding systemic disorder ; in other words, to a constitutional cause. Great care at the same time requires to be taken in reference to the use of the term "constitutional origin," especially in its application to the production of local disease. It were better, in fact, to use the term "systemic

origin" rather than constitutional, and it were better still to say that a local disease is produced *through* the constitution or *through* the system, than to say that such diseases are of constitutional or systemic origin. For, when we come to speak of origins truly, we must pass out of the body altogether and look for them in *external* causes alone. The body in itself is perfect as a healthy whole. It cannot by its physiological conformation produce any kind of disorder local or general. It can only be deranged by the medium of external agencies, which affect it by one of three ways : *physically*, as when it is subjected to accident ; *chemically*, as when it is subjected to the influence of a poison ; *physiologically*, as when by some abnormal condition in which it is placed, the normal acts are deranged and changed into pathological conditions. A ladder slips from me, and I am brought to the earth with dislocation of my shoulder or fractured skull : a physical external cause disables me. I take mercury to saturation, and a train of ineradicable evil follows : a chemical external cause has laid hold of me. I eat and drink too much, I eat and drink too little ; I sleep not enough, I sleep too long ; I tax my body over hard ; I tax my brain ; there-upon I contract gout or marasmus ; muscular hypertrophy, or mental imbecility ; the disease according to the cause.

Against the rule here urged as to the external origin of diseases, one exception might be claimed. While it would generally be admitted that the constitutional diseases which arise from accidents, from the effects of poisons, organic or inorganic, from the effects of insufficient or over-sufficient foods or drinks, from uncleanliness, from atmospheric variations, and from occupations and pursuits, have clearly an origin out of the body, it may be argued that those diseases which pass from parent to offspring, and which are known as *hereditary*, are, certainly, derived from simple derangement of the organism itself, independently of any influence from without. This argument is in part true, and in part false ; true as regards present agency, false as regards primary agency. For the fact is, that the child lives in the parent, and that the origin of all hereditary diseases and their local consequences, whether of hereditary syphilis or hereditary gout, is, in the mysterious chain of generation, traceable back to an external beginning. A progenitor received the disease from without, and passed it on.

Thus whether the disease be local or constitutional it comes from without, the only difference, between the more strictly local and the more strictly constitutional, lying in the circumstance that the local is some direct external influence telling, immediately, upon the affected part.

In respect to caries there may be a few direct local causes, physical or chemical; but I think they are comparatively few. I would reduce them to four in number: (a.) The action of heated fluids taken into the mouth. (b.) The action of acids upon the teeth. (c.) Deficient cleanliness of the teeth. (d.) Exposure of the teeth to certain chemical substances during work at some special occupations.

I have known of one or two instances in which toothache, incident apparently to injury from taking heated liquids into the mouth, has been followed immediately by commencing caries, but I should not like to make too strong a point of these observations. They are always open to some measure of doubt.

After the publication of Westcott's essay, on the action of the vegetable acids on the dental structures, I took for a long time a peculiar interest in the enquiry. My results were negative. It is true I found that feeble solutions of acetic acid did, after a time, act upon the enamel of a dead tooth; but I could find no evidence to support the hypothesis that such acid taken into the mouth, in solution with food, played any direct part in the production of caries. Deficient care in cleansing the teeth may no doubt be assumed as a cause of caries. This, however, must be accepted as a cause with certain explanations. Lower

animals, dogs, for instance, do not suffer much from caries when they are wholesomely and plainly fed ; and in like manner human beings who live on simple fare do not suffer. I should doubt if our friends at Hythe knew the sight of a toothbrush. Under the heading of uncleanliness we have, therefore, to take into account the subject of feeding, and other habits. It is when persons take great quantities of mixed foods, foods that remain between the teeth and undergo fermentation there, that caries begins and progresses : it is when persons indulge in the use of substances which cause a profuse secretion of saliva and dense salival deposits, that caries begins or progresses. In this last way tobacco smoke is injurious. Opposed to the use of tobacco myself I am candid enough to say that I do not think the smoke, by its mere local action, promotes caries : but I have often seen, in dirty smokers, a salival deposit which, cutting its way down into the structure beneath the enamel, sets up the primary abrasion and ulceration.

The action of the corrosive substances upon the teeth of those who are engaged in various industrial pursuits is very marked in some few instances, but is less extensive than might at first be supposed. In preparing my various lectures and reports on industrial diseases I have been brought, I believe, into personal contact with nearly

every class of worker, and I know of not more than one or two classes, the members of which are rendered specially liable to caries from their particular calling. The fur dyers, who are exposed to the fumes of nitric acid and the dust of sulphate of iron, afford the most striking illustrations of caries that have come under my notice.

The local origin of caries as a pure and simple origin is then, I think, rare; but when the local effect is sustained by the systemic then the carious change is easy enough. When there is organic failure of nutrition within the tooth, then slight physical and chemical activities on its surface produce a rapid effect, by assisting what we may call an inverted or internal process of ulceration, which tends to enfeeble the enamel from within; in other words, the enamel dying or dead is acted upon in its affected part as readily while it is in the living alveolus as it would be in the test-tube.

As a rule, in most cases of caries the two causes go on together. If one part of the digestive apparatus is impaired in its formation, there are other parts which share in the same derangement. The person with teeth of carious type is a dyspeptic, in nine cases out of ten. He is subject to acidity; his saliva is frequently acid, and unless he is punctilious in his cleanliness, he is ever retaining in the teeth products of food which are fermenting and are keeping up a regular acidity.

The balance between the internal resistance to decay is here so slight that the course to decay is readily turned. The mere rapid use of a hard toothbrush, daily, may lead to the physical disturbance which sets up the ulcerative degeneration.

And here two questions occur to me on which your experience would be to us medical men singularly interesting.

*First.* Does caries always proceed from without in direction of ulceration ?

*Second.* When one tooth has become carious does it, from the fact that it is carious, affect, in any stage of its disease, other teeth that are in immediate contact with it ?

The popular opinion on both these questions would be affirmative. For my part I do not know, but I infer in respect to the first point that except in case of direct external accident, such as fracture, or corrosion from the external application of a powerful corrosive, the course of the *karah* or digging out, is first from within ; while in regard to the second point, I should infer that the occurrence, so frequent, of caries in two adjoining teeth is rather the consequence of both being subjected to the same conditions of disease than to any communication of disease from one structure to the other.

#### SUMMARY.

To sum up. The substance of my argument as

to the reason of the prevalence of caries in these civilized times is, that the disease is traceable to three basic causes.

1. Syphilitic hereditary taint by which the vital resistance to decay of the secondary teeth is impaired.

2. Imperfect feeding of the body at a time when the permanent teeth are being developed.

3. The action of these two causes in combination, aided by local agencies acting upon the predisposed structure.

I place, therefore, the systemic causes as primary, relegating the local causes to a secondary place, except in those obviously exceptional instances, in which the local action, chemically or physically extreme, is sufficient to overcome all vital resistance.

And now, as I conclude, let me state the practical object of this paper. I hope that the paper bristles with practical points which you can take up and discuss to your heart's content ; but the point of points to which I want to direct your minds, I have not until this moment unmasked.

I am almost inclined to affirm that in the present state of civilization the national head would be most comfortable if it had no teeth in it at all, except such as you Odontologicals, in your wonderful competitions with Nature, so skilfully supply. Do not, however, think that I am about to suggest

the anticipation of the magnificent additions to your universal exchequer that would follow so grand a triumph of art and science. Far from it. My intention is diametrically opposed to any such monopoly of mind over matter. I want to draw you, as a body, to the side of us who would bring human life to such a natural condition as should yield to all persons teeth that would last them, without dentists at all, to the longest periods and spans of life : teeth as free from decay as those of the primitive men whose remains are encloistered at Hythe, and to whom the most accomplished dentist would, I fancy, have posed as, *rara avis in terris*.

I want, in short, to induce you to use your potent efforts in teaching the way to a better and nobler natural life ; in assisting to exorcise the terrible disease of diseases which demoralizes our common humanity ; and in assisting to promulgate the truth of the natural law that every mother, of every rank, has a duty to every child she bears, to nurse it herself and lead its vital steps, from herself, into independent existence.

I am sure I shall be taught many useful facts from the discussion of details which this paper affords ; but I shall be gratified the most sincerely if its wider intention be accepted, and a new phalanx of able scholars from your department be brought, by it, into the ranks, one day invincible, of preventive medicine.

## DISCUSSION.

The PRESIDENT said that knowing Dr. Richardson's habit of observing and thinking for himself, he felt sure that he would give the Society a good paper; but he did not expect that he would open up so wide a field for discussion as had proved to be the case.

With regard to the questions for which Dr. Richardson had requested answers, he thought that in both cases the popular idea would generally be allowed to be correct. There could be little doubt that caries spread from without inwards, and a fact that told strongly in favour of the external origin of the disease was this, that if a tooth, so badly decayed that all the disease could not be removed, were so carefully filled as to exclude all external influences, the progress of the decay would be greatly retarded, and, in some instances, practically arrested. He well remembered when this piece of heresy, as it was then considered, was first promulgated, but he was induced to try the experiment, watching the results carefully, and he was surprised to find how long teeth so treated would last.

MR. MUMMERY said he had been familiar with the Hythe skulls since he was twelve years old, and had examined them all very carefully some years ago, when engaged on his enquiries as to the prevalence of caries in this country in former times. He agreed with Dr. Richardson that they were of very diverse types, and had also noticed the absence of caries. He did not believe in the truth of the paper hanging up in the crypt, ascribing them to the result of a battle with the Saxons, at the same time they were evidently of considerable antiquity, and might very probably date back to the thirteenth or fourteenth centuries. As a proof that caries was not unknown in this country at the time these

skulls were said to date from, he might mention that he had seen the remains of a young patrician lady, buried in the third century, all of whose teeth, with the exception of the lower incisors, were carious. Judging from the evidences afforded by the skeleton, she could not have been more than 25 years of age.

He was surprised that Dr. Richardson had not noticed a cause of dental caries to which Dr. Kingsley, of New York, had called attention in a paper read by him before the International Medical Congress. There could be little doubt that the state of constant mental excitement in which people now lived had much to do with the premature loss of the teeth. It had long since been observed that in civilized races as the size of the brain increases, that of the jaw diminishes, and the teeth are at the same time less perfectly developed, and that generally a low standard of intellect was accompanied by a large jaw.

MR. COLEMAN said that Mr. Cartwright and himself had examined these skulls seventeen years ago, and reported the results to the Society. They found in a few cases distinct evidences of caries, and also of alveolar abscess, though the amount of disease of the teeth was very much less than would be found in the same number of modern skulls. It was apparent to them that it was a very mixed collection.

With regard to Dr. Richardson's statements respecting the effects of syphilis on the teeth, having been a colleague of Mr. Hutchinson at the time he was pursuing his inquiries respecting the effects of syphilis on the teeth, he had been led to take great interest in the subject himself, and his experience was that syphilitic individuals were scarcely more liable to dental caries than other delicate persons. Besides, syphilis appeared to have been unknown till some time in the fifteenth century, whilst dental caries prevailed amongst the ancient Egyptians and Romans. He was therefore disposed to attach much more importance to the use of soft food, and to other incidents of civilized life than to syphilis. When in Cairo his attention had been directed by his friend Waller Bey to

the marked difference between the teeth of the Bedouins and those of the town Arabs, and Mr. Wallis ascribed this to the difference in the diet and habits of life of the two classes, aggravated in the case of the latter by the use of stimulants.

With regard to Dr. Richardson's questions, he thought that the fact that a carious tooth could infect its neighbour was proved by the common observation, that if a decayed tooth was allowed to remain long in the mouth, the next one to it was pretty soon to be affected, but that if it was removed at an early stage, no more caries appeared.

MR. ARTHUR UNDERWOOD remarked that Dr. Richardson had dwelt most upon the constitutional causes of caries, and appeared to consider the local causes of very small importance. He (Mr. Underwood) was inclined to think that one at least of these local causes, viz., septicity—the presence of germs—was of very great importance. It had been found by experiment that a condition which was practically identical with caries could be produced under certain conditions in teeth out of the mouth, if air and dust were admitted; but that it did not appear if these were excluded. The teeth might be exposed to the action of no matter what acids and fluids, and if germs were carefully excluded, caries could not be produced: it was evident, therefore, that the presence of germs was a *sine quâ non* for the production of the disease. At the same time it appeared to be a fact that dentine might be exposed in the mouth to clearly septic conditions, and yet caries might not always occur. This showed that there must also be a predisposition, a constitutional weakness, which might be due to hereditary syphilis, or to improper feeding in infancy, or to any other cause which would lower the vital resistance of the part.

MR. OAKLEY COLES said he should like to call Dr. Richardson's attention to two by no means uncommon causes of caries which he had passed over without notice. In the first place it was common to meet with extensive outbreaks of rapidly progressing caries in adults after exhausting febrile diseases, as typhus and typhoid. And, secondly, Dr. Richardson had omitted to notice the mechanical effect of undue

impact between teeth as a cause of caries. If a china saucer was examined carefully a number of fine cracks would be found in the glaze at the points where the base of the cup came in contact with it. These cracks were produced by the repeated concussions between the base of the cup and that part of the saucer, and the same thing occurred in the case of the teeth, the enamel became cracked, the cracks admitted germs, and decay was the result.

He had in the course of his experience met with *one* case of internal decay. This was in a boy who had received a violent blow on an upper central which killed the pulp. Finding it necessary some time afterwards to remove the tooth, he found that the enamel was sound, but that the pulp cavity was enlarged by decay.

MR. HUTCHINSON said the ancient Egyptians and Romans appeared to have arrived at a pitch of civilization in some respects more luxurious than our own, yet they suffered less from caries than ourselves; it struck him that the practice of vaccination among ourselves might partly explain this difference. Dr. Magetot had lately pointed out how apparently slight derangements of the teeth of a child affected the nutrition of the dental follicles and damaged the structure of the growing tooth. Now the teeth most liable to caries were the six-year-old molars, and they would be specially liable to be affected by vaccination performed, as it usually was, at about the age of three months. Whilst re-vaccination performed at about seven years of age would be very likely to affect the formation of the wisdom teeth.

MR. DAVID HEPBURN said he had for some years past carefully watched the effects produced on the teeth in the case of some confirmed smokers, and he had come to the conclusion that the effect was rather beneficial than not; and that smokers were rather less liable to destructive caries than those who were not addicted to the practice. In some cases small cavities had formed, but these had become filled with a deep resinous deposit which formed a sort of natural stopping, and the progress of the caries was quickly arrested; this

carbonaceous deposit formed with apparently beneficial effects in situations which could not be reached by the tooth-brush. He would, however, admit that in those who smoked to excess the nicotine might lower the tone of the system, and this might react upon the teeth.

MR. CHARLES TOMES called attention to an allusion in Martial which showed that the destructive effects of caries were not unknown at that early date. The poet admonishes a lady that she cannot hope to pass off her artificial teeth as her own.

DR. RICHARDSON, being called upon by the President to reply, said he was very grateful for the way in which his paper had been received, and pleased at the animated discussion to which it had given rise. Mr. Coleman had been beforehand with him in his examination of the Hythe skulls: certainly he could not find a single carious tooth, though he had searched very diligently. He had noticed many of the molars much worn down, and had also met with some evidences of absorption of the alveoli which he now thought might, as Mr. Coleman suggested, have been evidence of disease.

He agreed with what had been said about the diminished size of the jaw which accompanied the progress of civilization, but he had not traced any direct connection between disease of the teeth and mental strain; nor did he think that alcohol had any direct effect in producing caries, though it might act indirectly by causing dyspepsia.

He could not accept the germ theory of carious disease at all: he could not admit the truth of a theory which appeared to exclude all consideration of hereditary influences, nervous phenomena, effects of the seasons, &c. The presence of bacteria was simply a coincidence: the disease was the result of products which we make within ourselves, and of the physical external influences to which he had referred.

In reply to Mr. Coles he would say that he had seen teeth loosened after typhus and other febrile diseases, and necrosis might result, but he had never seen caries result from any such

general diseases. He was much obliged to Mr. Coles for calling his attention to the effects of pressure, which he had no doubt might have a good deal to do with the local development of caries.

He could not entertain the idea suggested by Mr. Hutchinson with regard to vaccination. Re-vaccination especially was most irregularly performed, and its performance at the age of seven years was quite exceptional. He thought there was no evidence whatever of any connection between vaccination and caries.

He admitted that smoking tended to preserve the teeth to some extent ; but in *dirty* smokers he had noticed great deposit of tartar about the necks of the teeth, which appeared to cut into the tooth below the level of the enamel, and a ring of caries resulted. As to the tendency to caries which he had noticed amongst tobacco-workers, he could not say whether it was due to the dried action of the poison, or by induced dyspepsia.

On the motion of the President a vote of thanks to Dr. Richardson and the other contributors of the evening was carried by acclamation.

The President then announced that at the next meeting (December 5th) Mr. Coleman would read a paper on "Economical processes of Preparing and Administering Nitrous Oxide Gas."

The meeting was then adjourned.

The following Nominations have been received by the Council :—

Thos. Mansell, L.D.S., Ed., Hanley, Staffordshire.

Wm. Bates, L.D.S., I., Park Green, Macclesfield

C. Browne-Mason, L.D.S., Eng., Southernhay, Exeter.

C. D. Davis, M.R.C.S. and L.D.S., Eng., Oxford Road,  
Kilburn.

Cornelius Robbins, L.D.S., Eng., 32, Oxford Road,  
Kilburn.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*December 5th, 1881.*

THOS. A. ROGERS, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed,

The PRESIDENT announced that MR. CHAS. E. TRUMAN, M.R.C.S., Eng., of Southwick Street, Hyde Park, MR. T. H. POWER, and MR. S. ATKINSON, had been duly nominated for membership, and would be balloted for at a subsequent meeting.

MR. A. HALLIDAY BEST, L.D.S., I., of 14, Henrietta Street, Cavendish Square, was balloted for and elected a Resident Member of the Society; and MR. D. HEPBURN, of Edinburgh, was unanimously elected an Honorary Member.

MESSRS. C. ROBERTS and H. WOODRUFF were chosen to audit the Treasurer's accounts for the year.

MR. GEO. PEDLEY showed an ingeniously contrived drop-bottle, and also a "tell-tale," or water-trap, which he attached to the tube of his gas cylinder in order to show that the valve was properly closed. Before using this he suffered occasionally considerable losses of gas from its not being completely turned off after an operation: now the slightest escape of gas could be readily detected by bubbles passing through the water, and the waste was thus prevented.

He showed also a first upper molar, to the roots of which a small rough piece of bone was attached. He noticed this directly he had extracted the tooth, and at once concluded

that it must be a part of the floor of the antrum. On passing a probe into the alveolus he found that there was, as he expected, a free opening into the antrum. When the patient returned after two or three days the opening was found to be smaller and a week later it had completely closed, the patient having experienced no inconvenience whatever from the accident.

MR. W. E. HARDING, of Shrewsbury, related the following remarkable case of arsenical poisoning :--

About two months ago a lady came to him who had been suffering for some time from pain in a lower molar. He found there was a buccal cavity close to the gum, but being unable, on account of the great sensitiveness which existed, to examine it thoroughly, he applied a dressing of carbolic acid and sent the patient away. She returned two days later, and he then found that the pulp was exposed. He accordingly proceeded to destroy it by applying a minute portion of a preparation containing arsenic, known as Baldock's Nerve-killing Paste ; this was applied on a small pellet of dry wool and covered with more wool and sandarach varnish. Next day the patient's medical attendant called upon him and enquired whether he had not been using arsenic to the tooth, adding that the lady was suffering from all the symptoms of arsenical poisoning, including acute gastritis, and a rash. On enquiring further, Mr. Harding ascertained that his patient had suffered in the same way three times previously. On the first occasion a dentist in Liverpool had applied some arsenical dressing to a tooth ; some years later a doctor prescribed for her a mixture containing arsenic, and lastly her present medical attendant, finding the remedy indicated, again prescribed it, but in exceedingly small doses, yet the same effects were produced. The amount of the paste used by Mr. Harding did not exceed a pin's head in size, and it was very carefully applied, so that although the cavity was close to the gum, this was not in any way affected. The doctor removed the dressing directly the symptoms appeared, a few hours after its insertion, yet the patient was

very ill for several days, and did not completely recover her health for a fortnight. The rash resembled measles, but was slightly raised and was followed by desquamation. When the patient again visited him, Mr. Harding found that the nerve was completely destroyed, and he was able to fill the tooth without further trouble.

The PRESIDENT remarked that it was very important that patients possessing such idiosyncrasies should mention them when they came to a stranger to be treated, and any practitioner discovering these peculiarities should always impress upon the patient the necessity of doing so. He had once nearly lost a patient from haemorrhage owing to an omission of this sort, and in this case a word of warning to Mr. Harding might have saved the patient a good deal of suffering.

He then called upon Mr. Coleman to read his paper on “Economical Processes of Preparing and Administering Nitrous Oxide Gas.”

*On Economical Processes for preparing and  
administering Nitrous Oxide Gas.*

By ALFRED COLEMAN.

FROM the earliest period of the introduction of nitrous oxide as an anæsthetic into this country, I interested myself, as many amongst my audience are aware, in devising means for its more economical administration.

To the dental surgeon who had to prepare the gas himself, a process involving considerable care and trouble, as well as the sacrifice of much time, I believed such would prove a boon, but it was especially in respect of charitable institutions that I was induced to devote much attention to the subject. The cost of nitrous oxide to the Dental Hospital of London was during last year (1880) £73 18s., and the total amount paid for the same since its introduction in 1868 to the end of last year was £686 14s. 1d. Had it not been employed at the Dental Hospital, to a considerable extent, upon economical methods, it is questionable whether the charity could have borne so large an expense without demanding some fee from the patients or limiting the number of cases.

In private practice the matter of cost is hardly one for consideration, each case averaging from 1s. to 1s. 6d. ; about twice as much, probably, as the

cost of chloroform for a dental operation : at the same time to those who largely employ it, as do our professed anæsthetists, to be able to make half the quantity suffice, as well as to only have to transport about a much reduced weight would certainly be considerations. It is on the above grounds that I have ventured to bring before the Society the questions of the economical preparation and administration of nitrous oxide.

With regard to the former, the gas is, as you well know, invariably procured by the decomposition of nitrate of ammonia by heat, a salt prepared by saturating carbonate of ammonia with nitric acid, and which when exposed in a suitable vessel to a temperature of from 338°–500° F. decomposes into nitrous oxide and water :—



One pound of the salt yields theoretically 4 cubic feet of the gas, practically, owing to some loss, about 20 gallons.

The price of nitrate of ammonia is now 1s. 4d. per lb., and making no allowance for the cost of heat, materials for purifying, apparatus and labour, the gas costs 0·8d. per gallon.

There are other processes for making nitrous oxide, but the employment of most of them is quite out of the question, as the gas so obtained is largely contaminated with chlorine,

nitrogen, nitric oxide, &c.\* According, however, to Grotthuss and Pleischl a perfectly pure nitrous oxide is obtained by dissolving zinc in very dilute nitric acid. According to the latter one part of acid of sp. gr. 1·2 with an equal weight or more of water is most suitable for the purpose.

This process I determined upon trying, and ascertaining the truth of the above assertion, as according to Graham the gas so obtained is very impure.

An ounce of the strongest nitric acid, sp. gr. 1·5, reduced as above directed to sp. gr. 1·2, and this again diluted with a more than equal quantity of water, was put into a suitable flask with one ounce of granulated zinc, and connected with the ordinary wash bottle containing only ferrous sulphate—there being no chance of chlorine contamination, the potash solution was omitted. The gas came off readily and without colour, until by chemical action the temperature was considerably raised, and then the ruddy fumes of peroxide of nitrogen became obvious: to avoid this I subsequently immersed the flask in cold water. The gas thus generated was collected, some over warm

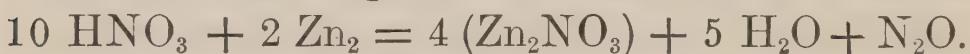
\* Graham gives the following:—"Elements of Chemistry," vol. ii, p. 652. Nitrous Oxide. This gas may be obtained in a state of purity by the action of protochloride of tin on aqua regia. The tin-salt is dissolved in hydrochloric acid, the solution heated over the water-bath, and crystals or cylindrical lumps of nitre, successively dropped into it through a wide tube dipping into the liquid. ("Gay-Lussac, Ann. Ch. Phys. [3] xxiii, 229.)

water and some over mercury : the whole quantity amounting to about  $1\frac{1}{2}$  pint. The portion collected over water was roughly tested by the combustion in it of carbon and by respiration, and it certainly did taste of admixture with the higher oxides of nitrogen, from which circumstance I should recommend its being first passed through water and after through two Woulffe's bottles, both containing ferrous sulphate, as well as being allowed to stand for some time over water before being used. That collected over mercury was found free from nitrogen, except in the form of air, a small quantity of which had, as is almost inseparable from such experiment, found its way into the apparatus. There were certainly traces of the higher oxides of nitrogen, but as these can always be converted by deoxidizing agents into the lowest oxide, I feel I may go the length of saying that, with proper precautions, nitrous oxide may be prepared upon this plan for anæsthetic purposes, provided, of course, that the acid employed be fairly pure and the zinc free from arsenic or antimony.\* After the experiment the remaining

\* With regard to the above statement I desire that it be not regarded as an ascertained or settled fact. I believe it is of the utmost importance that the nitrous oxide employed for anæsthetic purposes should be absolutely pure. On recently hearing that two deaths out of 290 cases had occurred at the hands of one individual, viz., Professor v. Nussbaum, of the University of Munich, and Surgeon General to the Bavarian army, I at once concluded that the gas administered could not have been pure. I cannot, however, say that this view is strongly or at all supported by the

#### 44 ON ECONOMICAL PROCESSES FOR PREPARING

zinc (well washed) weighed about  $\frac{1}{2}$  oz., hence I deduce the following as the formula of the re-action.



history of the cases, for which I am indebted to Dr. Sternfell, who has kindly translated for me the abstracts of one published in the "Deutsche Chirurgie," edited by Professors Billroth and Leucke (20th part, Lieferung) and who also wrote to Professor v. Nussbaum for further particulars, which I am sure will be interesting to the Society.

"1. Abstract from the "Deutsche Chirurgie." Von Nussbaum has also seen and described a case of death after use of nitrous oxide gas.\* The subject was a hard drinker, who had suffered weeks previously from uræmic intoxication, and on whom the "Boutonnière" had been performed. Bougies had been employed fifty-three times under chloroform, but on the fifty-fourth occasion nitrous oxide was used. As the gas was administered the patient assumed a deep cyanotic appearance and never recovered consciousness, although he breathed for 50 minutes without the aid of artificial respiration, and after this for 15 minutes longer under the influence of Faradisation, applied in the course of the phrenic nerve. At the post-mortem examination Voit† found that the blood collected from the heart had its red corpuscles destroyed and dissolved in a reddish-brown viscous fluid.

"2. Additional remarks of Professor v. Nussbaum, as supplied to Dr. Sternfell. The above case was the 280th in which I had employed nitrous oxide, and my first case of death; previously I had witnessed some alarming cases, especially of very marked cyanosis, and it was with unwillingness that I gave it in this case. The patient, an Italian officer, begged hard for it, and persuaded me to give it him contrary to my inclinations, but I consented as he appeared to think that I refused it him on the ground of giving myself trouble. Upon administering the gas the patient soon became deeply cyanotic, and some time previous to his being sufficiently anæsthetised for passing the bougies through the stricture in the urethra. The lividity continued throughout the time he was inhaling the gas, viz., 65 minutes: at this period I withdrew the gas and allowed the patient to inhale chloroform for some few respirations. The chloroform did not alter the cyanosis or the stertor. I therefore began immediately to stimulate the patient energetically, rubbing the extremities, pulling forward the tongue, sprinkling with cold water, tickling

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\* Dr. Kappeler gives in the preceding a short account of five cases of death after the use of nitrous oxide, three of which happened in America and two in England.

† V. Voit is Professor of Physiology at the University of Munich.

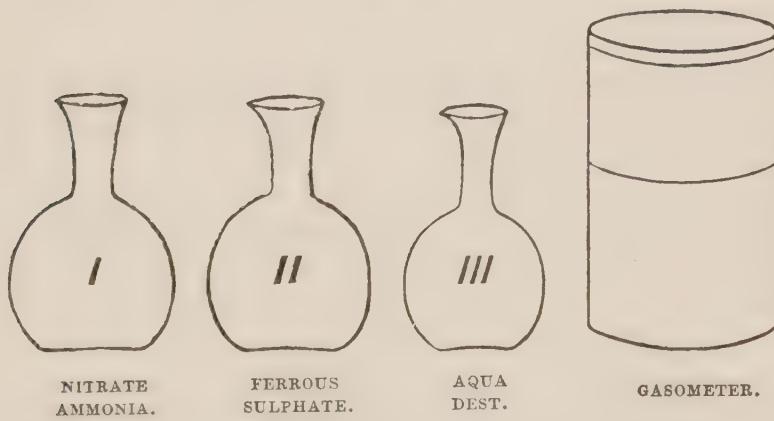
Theoretically this should yield rather less than 2 pints, practically it yields about  $1\frac{1}{2}$  pint.

The important question of cost of production  
the nose and lips with naphtha, and galvanising the heart by acupuncture,  
&c. The patient continued deeply livid, almost black, but evidently  
breathed by himself for 50 minutes after the discontinuation of the gas,  
when he ceased respiration, but under Faradisation in the course of the  
phrenic nerve, breathing continued for 15 minutes longer, although no  
pulsation could be detected. The patient then died. The most inex-  
plicable symptom in this case was, that although the patient breathed  
deeply he continued being so deeply cyanotic, and that the same condition  
continued during the use of the chloroform.

" Voit gave the following explanation : ' The gas, by the alcohol which  
was in the stomach, may have become a poisonous (blood-corpuscle  
destroying) nitrous compound, and the respiration did not remove the  
cyanosis because the red corpuscles were destroyed, and consequently the  
reception of oxygen into the blood was not possible.' The blood was  
of a reddish-brown colour and viscous nature, and not one red corpuscle  
was to be found.

" The gas was precisely the same as that I had employed for the 279  
preceding cases, and prepared by myself with great care. The late Pro-  
fessor Liebig witnessed me prepare nitrous oxide, and praised my method  
as being the right one. The following diagram will show my arrange-  
ment :—

FIG. 1.



" I took the gas from the gasometer in the well-known large india-rubber  
bag or balloon, and I used an English mouth-piece with valves excluding  
the expired gas.

" After the foregoing 280 cases I only employed nitrous oxide ten  
times, and during them met with another death. In this case a post-

may now be considered. Nitric acid of sp. gr. 1·36 (the cheapest form in which it can be purchased) may be obtained in not excessive quantity at, say, 6d. per lb., whilst  $\frac{1}{2}$  lb. of zinc, the suitable quantity to combine with the acid, will cost 2d., and this 8d. will yield 24 pints = 3 gallons of gas. On the other hand nitrate of ammonia  $\frac{1}{2}$  lb. at 8d. will yield 10 gallons of gas. Here, doubtless, my audience may think, is an end of attempting to prepare economically nitrous oxide by means of mortem examination was refused, and therefore I am less sure how death occurred than in the first case.

"The patient in this case was suffering from purulent internal otitis, and was almost moribund at the time I proceeded, as a last resource, to trepan his processus mastoideus. Soon after breathing the gas he became deeply cyanotic, and then pulseless, and died, notwithstanding every effort to resuscitate him. After breathing had ceased galvanism applied in the direction of the phrenic nerve had but little effect, as was the same applied with acupuncture of the heart. The lividity was not so great in this as in the former case, and it is possible that death resulted from meningitis and not at all from the anaesthetic. The condition of the patient was a very bad one, and trephining was only resorted to as a final expedient. I had not seen the patient previously; indeed I only knew him for a few hours."

I think the foregoing description negatives the idea that the death, in either of the recorded cases, arose from the administration of an impure gas, at the same time I think the process of purification described by Professor v. Nussbaum is not as perfect as that now generally employed in this country, although his received the approval of that profound and eminent of chemists Baron Liebig. My friend Mr. George Parkinson has kindly allowed me to inspect his apparatus, which appears to me to be very perfect indeed, although it does not differ very materially from that I and others have employed, excepting, perhaps, in a more perfect washing of the gas in water, certainly much more so than in the arrangement of Professor v. Nussbaum, in which it will also be observed the potash solution is absent.

I am sure the Society will feel grateful, like myself, to Dr. Sternfell for procuring the interesting details of these cases from Professor v. Nussbaum.

zinc and nitric acid ; but not too fast : we have in this process some so-called waste products, whereas in the nitrate of ammonia process, after obtaining the gas, water alone remains as the residue.\* Now nitrate of zinc is a commercial article, at least my friend Mr. S. Gale, of Messrs. Bell and Co's., Oxford Street, informs me that he has been asked to give a price per cwt. for it. At all events we can, by sulphuric acid and heat, get back our nitric acid. Now sulphuric acid may be obtained in carboys at about 1*d.*, or even less, per lb. So that we may substitute the one penny for the sixpence, the cost of the nitric acid ; and then, moreover, we get another residue, viz., sulphate of zinc, which at the present moment brings in the market 3*s.* per cwt. These facts put a very different complexion on our first calculation, and we may express them thus :—

Sulph. acid, 1 lb., 1 <i>d.</i>	Zinc $\frac{1}{2}$ lb., 2 <i>d.</i>	3 <i>d.</i>	{ produces fully 2 lb. zinc sulphate, which yields $7\frac{1}{2}d.$ , nearly, and 3 gallons nitrous oxide.
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Taking the  $7\frac{1}{2}d.$  (nearly) to set against the expenses of the above process, we ought to have

\* I except the case, of course, in which the manufacturer of nitrous oxide on a large scale prepares his own nitrate of ammonia from the carbonate. Here, especially if he possess steam-power for compressing the gas, he may turn to profitable account the carbonic acid given off by making aërated waters. Steam-power also, which affords an almost unlimited quantity of condensed (pure) water, is also of no small value to him for dissolving his ferrous sulphate, which suffers great loss when mixed with ordinary spring water.

the gas as a waste product, and which I think might be supplied to us in the liquid form, at about a 1*d.* to 1½*d.* per gallon. It is, of course, quite out of the question to suppose that dentists could adopt the profitable manufacture of nitrous oxide by this plan, it could only be carried out upon a large scale and in suitable premises. It is, I think, a matter I may well leave to the consideration of those who prepare the gas for us on a large scale, and to whom I take this opportunity of expressing our sense of obligation for the great convenience they render us, by supplying it to us in so convenient a form. With regard to the above calculation, it is important to bear in mind that it is highly probable that so large a quantity of zinc sulphate coming into the market as a waste product in the process would very soon reduce the value of that article.

I now pass on to the matter of economising during the process of administration. Very soon after the introduction of nitrous oxide I remarked that the experiments of the celebrated physiologist Hermann showed that the gas when inhaled was not decomposed in the blood,\* and it at once occurred to me that consequently the same gas

\* In the "Ohio State Journal" it is stated that a terrier was made to breathe the gas for an hour, air being rigidly excluded. During this period there were no evidences of asphyxia; sometimes the pupil was dilated, sometimes not. Sometimes the dog was conscious, sometimes not. I venture to affirm that, in this case, the dog got air as well as gas; the above being wholly inconsistent with all carefully conducted experiments.

might be employed over again, provided the carbonic acid and other lesser gaseous products from the blood were abstracted. At the first blush I overlooked the fact that it must be mixed with the air in the lungs at the time of breathing it, even if only residual. That the economic process could not be carried out to such extent was evident, but that a much smaller quantity might suffice appeared quite practicable. Some of my first experiments consisted in diluting out the air contained in the lungs by nitrogen, and then turning on the nitrous oxide, which after inhalation, was returned to the bag which previously contained it, the carbonic acid being removed in the passage. Nitrogen may be obtained very cheaply, but as it cannot be compressed to any extent, at all events as compared with nitrous oxide, the apparatus becomes bulky as well as complicated. Moreover, some nitrogen and air always returned with the nitrous oxide. The nitrogen was therefore discarded, and I contented myself by rejecting the first portions of nitrous oxide respired, until I believed all air had been removed from the lungs. At this point the expiratory valve was closed to the air, but connected with a tube which allowed the return of gas to the bag, after passing over lumps of quicklime recently slaked with water. Other substances have since been employed for

abstracting the carbonic acid, viz., milk of lime, solutions of caustic potash or soda : the gentlemen who suggested them evidently being unacquainted with the fact known to all practical chemists, viz., that of all substances we possess none so readily and so thoroughly abstract carbonic acid from other gases as does recently slaked lime, or rather lime in the process of slaking. This arrangement proved quite satisfactory ; but a witness of its effects, I believe Mr. Kirby, of Bedford, pointed out its unnecessary complication, and that the gas might pass direct to and from the bag over the lime, a suggestion I at once gladly adopted.\*

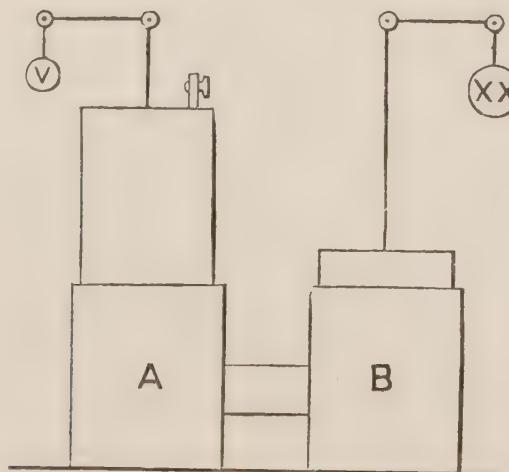
In carrying out some experiments for the Committee appointed to investigate the merits of protoxide of nitrogen as an anæsthetic, I found that as anæsthesia by its means approached, so the carbonic acid given off at the lungs greatly diminished, a fact subsequently confirmed by the experiments kindly made by Professor Frankland, at my request, for the same Committee. Indeed, the amount became so small that it might be disregarded, and therefore I have long discarded the lime arrangement. Previously, however,

\* That the results of this process were equal to those effected by the ordinary method was the opinion of a committee of gentlemen, fully competent to judge, appointed by the Managing Committee of the Dental Hospital of London, and who formed their conclusions from witnessing both processes as applied to the same patients.

Mr. Clover had introduced his useful contrivance of the supplemental bag, which allowed of a certain proportion of the gas being breathed over again.

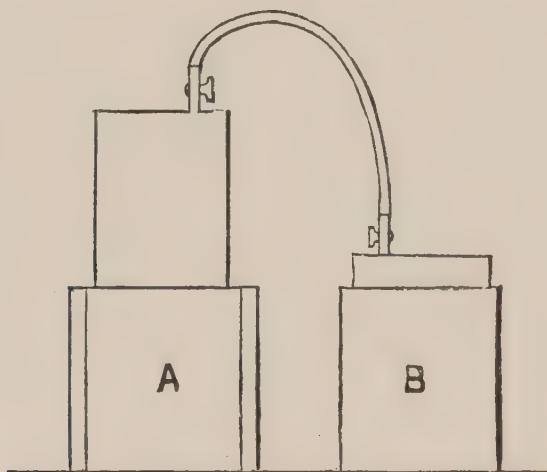
This plan of administering nitrous oxide I have now pursued for a considerable number of years, and by it I think I may claim to have saved the hospital at this building a very considerable sum. But I yet believe a far more perfect economy to be possible, viz., by a separation of the products of respiration during the whole administration by means of the solubility of nitrous oxide in water. My first endeavours in this direction were to effect the separation by differential pressure. To accomplish this I had two large gasometers connected together so that the water supplied became common to both. From one which I will call (B) pure gas was respired, and the products of respiration conveyed to that I will call (A). Fig. 2. This latter, of course, contained air,

FIG. 2.



carbonic acid, and nitrous oxide. Considerable pressure was put upon (A), and the nitrous oxide was dissolved in the water, a little caustic potash in the water fixed the carbonic acid, and finally the remaining air was let out. By lessening the pressure on the gasometer (B), it was hoped the nitrous oxide would be given up from the water, but it was found that the attraction of the water for the gas was too great to allow of this. The gas could only be expelled from the water by heat. To effect this it was now necessary to have the two gasometers distinct, Fig. 3. The

FIG. 3.



products of respiration received into (A) were, as in the former case, separated by the same process. After expelling the air, the water in the gasometer was raised to nearly the boiling point, and the nitrous oxide thus given off at once conveyed to (B), the water of which was previously saturated with the gas. By this means nearly the whole

of the gas first employed could be recovered. The practical difficulties in the case are, firstly, the small solubility of nitrous oxide in water. According to the best authority (Bunsen) water at the temperature of 60° F. takes up about three-fourths of its own volume (water at 15° C. absorbs 0·7778 ; alcohol, 3·2678 of nitrous oxide). I cannot doubt the correctness of Bunsen's results, but experiments carefully conducted with recently boiled distilled water, yielded in my hands only about two-thirds of gas absorbed. Secondly, and this is of more consequence, viz.: the length of time consumed in the process of absorption, it being some days. Several suggestions occur, however, by which the latter evil or both may be reduced or done away with.

Thus with regard to the small solubility of the gas in water, this may probably be much increased by the admixture of the latter with some substance that will enable it to take up a much larger volume without any decomposition of, or chemical change in, either. Alcohol takes up more than three times its own volume of nitrous oxide at the temperature of 60° F., but in dispelling it again by heat, we should have the alcoholic vapour given off with it, so that that substance is inadmissible. That such substances are to be found is proved by the ready manner in which nitrous oxide is taken up by the blood, and given off again

from it. Whilst it is my hope that I may be able to hit upon some substance that will effect the object in view, I may point out, that in cold (I mean, of course, the abstraction of heat) we have an agent which will readily effect our object :—thus, water reduced to a temperature of 32° F. absorbs 1·3052 of its volume of nitrous oxide, and also more readily, and if by a suitable mechanical arrangement we agitate the two together the process of absorption will be greatly accelerated. The expense of ice in reducing the temperature of the water, and of gas in raising it, would, of course, be a consideration, but we might adopt a most ingenious appliance now, I learn, employed on the London and North Western Railway in their carriage foot-warmers. These contain a chemical compound which, by simply adding water, produces a considerable heat, which after a time is succeeded by great cold, and this process may be continued for a very considerable number of times. My information being only oral, and my informant not being conversant with the actual process, the materials employed being kept a secret, I may have incorrectly described the actual conditions as they occur, but of the fact that great alternations of temperature are by some such means brought about there can be no doubt, and that such could be applied for the purpose I have indicated is more than possible.

## DISCUSSION.

The PRESIDENT remarked that Mr. Coleman was so well up in chemistry, and known to be so thoroughly master of the subject of Anæsthetics, that he felt some hesitation in venturing to criticise his suggestions; he felt sure, however, that they would for this reason at once commend the attention of those who were competent to judge of them and turn them to account. Mr. Coleman had spoken of pure zinc, but he would remind him that zinc was rarely pure, it frequently contained arsenic, and he thought that this, if not carefully eliminated, might prove a dangerous impurity.

MR. STOCKEN asked what strength of acid Mr. Coleman thought best for his process; that of high specific gravity (1.5) was scarcely ever free from nitrous acid. He thought that Mr. Coleman had scarcely made sufficient allowance for the cost of labour; the process was a somewhat complicated one, and would require a considerable amount of supervision. He would also call attention to the fact that the price of zinc fluctuated a good deal at present, and he feared that any extra demand, such as Mr. Coleman's process would give rise to, might increase this considerably.

MR. BRAINE said there were two statements in the paper upon which he felt disposed to comment. In the first place he did not think that the deaths which Mr. Coleman had referred to were due to nitrous oxide, the symptoms were altogether unlike those produced by a fatal dose of the gas. Prof. Voigt's explanation also appeared to him to be rather far-fetched. As to there being any special danger in supplementing gas with chloroform, he could only say that he had himself, in the course of some experiments, inhaled to unconsciousness a mixture of 10 per cent. of chloroform with nitrous oxide and recovered safely.

In the second place, when a patient was suffering from cessation of the heart's action due to an anæsthetic, he should not be disposed to try acupuncture as the best mode of setting it going again. He believed nitrite of amyl was the best agent for this purpose ; it was sold in glass capsules containing two minims in each, and all that was required was to break one of them in a handkerchief and let the patient inhale it.

DR. STERNELL said that most of the physicians in Munich thought that these deaths were not due to the gas alone ; the fact that one of the patients continued to breathe for fifty minutes before death occurred was quite unlike the usual transient effects of nitrous oxide.

MR. CUNNINGHAM, of Wisbech, said that when he took possession of his present abode he found a large gasometer and other apparatus for making the gas ready to hand on the premises, and thought he might as well make use of them. But his first experiments were not as successful as they might have been. On one occasion he got an evolution of dense white fumes, which escaped into the street, and in a very short time his house was surrounded by an excited crowd and he was honoured by a visit from the town fire-engine. But he soon found out how things should be done, and now he made his own gas regularly without any accidents and with very little trouble ; he had had the same retort in use for three years. He thought that all dental students should receive instruction in the best mode of making the gas, and should have some opportunities afforded them of carrying out these instructions ; no doubt it was generally cheaper to buy the gas ready made, but practitioners were occasionally so situated that it was not very easy to obtain regular supplies, and then their practical experience would be useful. A very good paper on this subject had been read before the Odonto-Chirurgical Society during last winter by Mr. Williamson.

MR. COLEMAN, in reply, said that the admixture of arsenic with the zinc was not of much importance, since the gas

could readily be freed from any arsenical vapour by passing it through a proper arrangement of wash bottles. With regard to Mr. Stocken's objections he thought it probable that the increased production of sulphate of zinc which would result from the adoption of the process he had described would lower the price of that article, but he did not think that the consumption of zinc would be so great as to cause any serious advance in the price of the metal. The strength of the commercial nitric acid was generally about 1·36; he had taken the sp. gr. at 1·2, and in order to obtain the gas as pure as possible, this should be still further diluted. He agreed with Mr. Cunningham that it was desirable that dental students should have a practical acquaintance with the best methods of making the gas, but it was not always easy to give them opportunities for acquiring it. At one time the gas used at the hospital was manufactured on the premises, but this was now discontinued.

The question of saving and purifying the gas which had been used was entirely a matter for large institutions, and could never be profitably carried out in private practice, but he had hopes that in time means would be found for effecting this without any great expenditure of time or labour.

A vote of thanks was then passed to Messrs. Harding and Pedley, and to Mr. Coleman for his paper, and the meeting was adjourned.



The following applications for Membership have been received by the Council:—

George Cunningham, D.D.S. Harvard, York Row,  
Wisbech.

George Harris Dowsett, 1, Gloucester Street, Portman  
Square.

William Henry Key, L.D.S. Glasg., West Parade, Rhyl,  
North Wales.

Thos. Edward King, L.D.S. Eng., Coney Street, York.

Fred. Newland Pedley, M.R.C.S., L.D.S. Eng., 242,  
Camden Road, N.W.

E. Lloyd Williams, L.D.S. Eng., 2, James Street,  
Buckingham Gate, S.W.



# Odontological Society of Great Britain.

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## ANNUAL GENERAL MEETING.

*January 9th, 1882.*

THOS. A. ROGERS, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed,

The PRESIDENT declared the ballot open for the election of the office-bearers for the current year, and MESSRS. A. G. HOCKLEY and WILLOUGHBY WEISS were selected, in the way prescribed by the bye-laws, to act as scrutineers of the ballot.

The PRESIDENT announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz.:

MESSRS. THOS. MANSELL, L.D.S.E., Hanley.

WM. BATES, L.D.S.I., Park Green, Macclesfield.

CHAS. BROWNE-MASON, L.D.S. Eng., Southernhay, Exeter.

CHAS. D. DAVIS, M.R.C.S., and L.D.S. Eng., Oxford Road, Kilburn.

CORNELIUS ROBBINS, L.D.S. Eng., Oxford Road, Kilburn.

The following candidates were then balloted for and elected non-resident members of the Society, viz.:

MESSRS. THOS. HENRY POWERS, Walton-on-Thames; and S. ATKINSON (Cavaliere), Largo San Ferdinando, Naples.

MR. HENRY SEWILL showed casts of a remarkable case of enlargement of the external alveolar wall of the upper jaw.

There was a series of very hard—evidently bony—masses all along the alveolar border, but most marked over the molar teeth. The patient, a gentleman, aged 39, had not been aware that he was the subject of any malformation ; and Mr. Sewill was inclined to believe that the enlargement had been due to some irregularity during the process of ossification, and that it was not what was usually meant by the term “pathological growth.”

A few months previously he had shown models illustrating cases of protrusion of the front teeth which occurred in women after the age of 25. The teeth became gradually more and more prominent, they became elongated in their sockets, and finally loose ; but there was no swelling or discoloration of the gum, no discharge of matter, and no outward evidence of disease of any kind. Sometimes but one tooth was affected, sometimes several. The model he then showed was taken from a lady who had been under his observation for about six years, and in whom only one upper lateral was affected in this way. These cases were very chronic, their pathology was not known, and the only treatment was to remove the affected teeth, and replace them by artificial ones.

MR. SEWILL also showed models of two cases of prolonged retention of temporary teeth which had lately occurred in his practice, for the sake of ascertaining what in the opinion of those present was the best way to treat them. A young lady, aged 15, was brought to him with an upper central incisor still in its place, but very loose, so loose that Mr. Sewill easily removed it with his finger nail. From the appearance of the gum (as shown by the cast) he judged that the permanent tooth was not far off, and would shortly be erupted ; but as, after waiting some weeks, it did not appear, and the young lady was going abroad, Mr. Sewill fitted an artificial substitute. In the other case a loose temporary canine was removed from the mouth of a child 12 years of age, but the permanent tooth had not appeared. What was the best course to pursue in cases like these, but where the temporary teeth were firm ?

He next exhibited a cast showing the harm which might be done by attempting to cure cleft palate by operation in

unsuitable cases. The young lady from whom the model was taken had been left after the operation in a worse state than she was before. A small portion of the soft palate had alone united—not sufficient to close the fauces, while at the same time preventing the use of an artificial palate.

At the April meeting of the Society he had related a case in which paralysis of the parts supplied by the inferior dental nerve had followed the extraction of a lower wisdom tooth. The roots of the tooth were very large, the apices were curved backwards, and in one was a foramen and on the other a groove through which the inferior dental nerve had evidently passed. On May 26th, some two months after the operation, the patient declared that there was still complete absence of sensation; but on testing for himself, Mr. Sewill found that there was a little,—the patient could just feel when a piece of paper was drawn along the skin. She then went into the country for some months, but on December 9th, Mr. Sewill was pleased to hear from her that almost complete recovery had taken place. She mentioned that a feeling of intense coldness in the part was occasionally noticed, but practically the recovery was complete. This was undoubtedly a bad case, the symptoms pointed to an actual rupture of the nerve, and the fact that complete recovery had occurred would, he thought, justify a favourable prognosis being given in any similar case. No treatment had been attempted.

Cases of the same kind had been recorded where anæsthesia had continued for a much longer period, and in such instances it might be worth while to attempt to expose the nerve by operation at the injured spot, to bring the severed ends into apposition, and free the nerve from the pressure of broken pieces of bone. A case had been reported by Mr. Wheelhouse, of Leeds, in which paralysis had resulted from the severance of the sciatic nerve, and the envolvement of the ends in a fibrous cicatrix. Mr. Wheelhouse cut down upon the nerve, freed the ends from the cicatrical adhesions and placed them in apposition; union took place and the patient regained the use of the limb.

The PRESIDENT thanked Mr. Sewill for his very interesting series of cases. The last one appeared to him especially interesting, since the occurrence of loss of sensation after extraction was always a source of annoyance, and sometimes of more serious trouble to the unfortunate operator. He thought Mr. Sewill was to be congratulated on the termination of the case, since they did not always turn out so favourably ; some had been reported in which sensation had not been regained even after a considerable interval. The cases of loosening of the front teeth were also very interesting, and he hoped that some further enquiry would be made into their pathology.

Mr. COLEMAN said that with regard to the cases of retained temporary teeth he thought that where there was some evidence of absorption of the root of the temporary tooth, and where the appearance of the gum gave some indication of the presence of the successor, he believed that the fitting of a plate was the best treatment. The pressure of this upon the superimposed gum appeared to have a decided effect in hastening the eruption of a retarded tooth ; and he had met with several cases in which teeth which had been long looked for but had not appeared, had shown themselves soon after the patient had consented to wear a plate.

He had only that day seen a case of continuous protrusion of the upper central incisors of the kind described by Mr. Sewill. The process had been going on for several years, but the teeth were still quite firm in their sockets. He thought it was due to a perversion of the normal process of growth, *i.e.*, of the alterations which, according to his views, always take place in the maxilla, and which under certain circumstances affected the eruption of the teeth.

MR. F. J. BENNETT thought that the conditions in Mr. Wheelhouse's case were not exactly parallel with those of the cases referred to by Mr. Sewill, and he thought it would be wiser to leave the restoration of the function of the inferior dental nerve to time than to attempt what appeared to him would be a delicate and, to the patient, formidable operation.

MR. S. J. HUTCHINSON said he had met with several cases in which temporary teeth had been removed and the permanent had not appeared, and he thought that as a general rule it was best to leave them. In his experience the canines were most often persistent; he had at the present time a patient, aged 35, with a temporary canine in place and useful, and he had seen many others in which these teeth had remained to a somewhat less advanced age.

MR. CHARTERS WHITE mentioned the case of a young woman, aged 24, who had the upper temporary canines still in place, the permanent canines being also erupted side by side with them. Mr. White removed the former; they had appeared to be quite firm, but he found that the greater part of the roots had been absorbed, so that the attachment must have been chiefly fibrous. A curious circumstance in the case was that the patient's father had a precisely similar irregularity.

MR. J. R. MUMMERY remarked that the second lower temporary molars were also frequently retained; he had met with at least six cases of this in his own practice. The last was that of a young lady, aged 18, who had both of these teeth in place; Mr. Mummary removed them, and the bicuspids came up almost at once.

MR. MARCUS DAVIS said he once happened to have a subject for dissection, apparently about 50 years of age, in whom a second temporary molar was still persisting. Mr. Davis made a section of the jaw in order to ascertain, if possible, what was the cause of the irregularity; he found the space in which the permanent tooth should have been, but there were no signs of the tooth itself.

MR. HOCKLEY said the most extreme case of the kind which he had yet seen was that of a lady who had only three permanent teeth in the upper jaw and two in the lower, all the rest being temporary.

The PRESIDENT said he was of opinion that no general rule could be laid down for the treatment of these cases; the

practitioner must be guided by the circumstances of each case.

MR. SEWILL said he would only say, in reply to Mr. Bennett, that he would only advise an operation after sufficient time had elapsed to allow of an opinion being arrived at as to the prospect of spontaneous restoration of the function of the nerve.

DR. STERNFELD exhibited a series of microscopical specimens illustrating the structure of the teeth of the common pike, and also handed round carefully executed drawings of the sections themselves. He stated that in the early part of last year he made, at the instance of Professor Kupffer, Professor of Anatomy and Embriology at the University of Munich, some investigations into the structure of the teeth of this fish, the results of which had just been published in the "*Archiv für Mikroskopische Anatomie*." He then proceeded to give the following description of the drawings and of the specimens from which these were taken:—

Fig. I is a section of a lower jaw of a pike, made longitudinally through the jaw and tooth; the tooth is fully developed and ankylosed to the jaw. Almost on the limit between the tooth and the jaw there is, beginning from the left side of the drawing, a groove to be seen which runs to the central part of the tooth. The tooth being divided down the middle, this groove forms with the other half of the tooth, a channel through which the vessels and nerves enter the tooth, as they do through the apical foramen of human teeth. The tooth is seen to be composed of two parts, a crown and root-piece, the latter not being covered with enamel. This section was only magnified 15 diameters, and therefore the minute structure was, of course, not visible.

Fig. II, magnified 90 diameters, showed on the left side that part of the tooth which he had called the root-piece, and on the right a portion of the jaw. The bony canals in this and the next three specimens had been filled by imbibition with aniline blue. The canals in the bone run horizontally, and from behind forwards, whilst those in the tooth are vertical,

and thus a section made horizontally through the tooth and jaw gives longitudinal sections of the tooth canals, and transverse sections of those in the jaw. Around the latter Haversian canals can be seen, but beyond a slight appearance of striation, nothing can be made out as to the minute structure of the tissues either of the jaw or tooth.

Fig. III shows a part of the same preparation magnified 90 diameters. At the lower part is the root, in the upper the crown of the tooth. Between the canals of the crown a very fine network of primitive tubuli is to be seen, which was also described by Professor Owen, who called it a "moss-like plexus." Dr. Sternfeld would call the part of the tooth showing this network of tubuli, Vasodentine. In the same part of the field in which the network of primitive tubuli of the vasodentine is to be seen, there is in the peripheral part of the tooth (on the right-hand side of the drawing) a structure which will be afterwards described as dentine proper. In the lower part of the preparation neither the network of primitive tubuli nor the layer of true dentine was to be seen, so that the two parts of the tooth could be easily distinguished the one from the other.

Fig. IV shows a portion of the dentine proper magnified about 330 diameters. Of the vasodentine only a few canals are drawn; the canals on the border line between the vasodentine and proper dentine send into the latter numerous dentinal tubuli, which after a short course break up into a network still more delicate than that of the primitive tubuli of the vasodentine. Dr. Sternfeld calls that part of the true dentine which shows the dentinal tubuli, the *internal region* of the dentine, and that with the network the *external region*. From this network a number of very fine tubuli run to the periphery of the tooth in the enamel, as shown in Figs. VII and VIII.

Fig. V shows a transverse section of the lower part of the crown; in the central part of the tooth the vasodentine again shows the network of primitive tubuli between the larger canals, and towards the periphery there is true dentine, which is, however, not so largely developed in this part of the tooth.

The drawings just described were taken from sections made by grinding down undecalcified teeth ; those about to be described were made with sections of decalcified teeth. By decalcifying and staining with carmine or hamatoxyline many details can be discovered which cannot be seen in undecalcified preparations.

Fig. VI is a transverse section of the root ; the greater part of its matrix consists of round, square or polygonal discs, which represent transverse sections of bunches of fibres. These are embedded in a homogeneous substance which is found to vary in amount in different preparations. The walls of the canals appear as lighter rings, and are covered with endo-epithelial cells. In the lumen of the canal are transverse sections of one or two blood vessels with muscle-nuclei and inner endo-epithelium ; in some places are spindle cells running from the surface of the vessel to the wall of the canal, the former appearing to be suspended in the latter.

Fig. VII is a transverse section of the crown ; the vaso-dentine in this drawing is very similar to that seen in the last figure. Many transverse sections of blood vessels fell out of the canals, which are smaller in this part of the tooth. The walls of the canals are very plainly seen as rings marked with slight concentric striation ; the substance of the true dentine is almost quite homogeneous. The dental tubuli are to be seen running to the periphery and breaking up into the network referred to. On the left hand side of the drawing the external surface of the dentine is seen to be covered with true enamel (marked S).

This is better seen in Fig. VIII under a magnifying power of 750. The enamel consists of prisms, which are separated by very small tubuli, arising from the network of the dental tubuli, and containing a granulated mass. A perfectly homogeneous layer was found covering the prisms, and beyond this I was able to separate a cuticula by a method described in my original paper.

Fig. IX is a transverse section taken from a tooth growing in the palate of the upper jaw ; these teeth are never calcified

so completely as the teeth of the lower jaw : they show very clearly the fibre bunches, and for this reason only is the illustration given.

Fig. X is a longitudinal section of the vasodentine of a fully developed tooth. The walls of the canals and the vessels are covered with endothelial cells; in some places spindle cells are seen between the walls of the canals and the surface of the vessels.

The matrix appears usually homogeneous in longitudinal sections. Some few small tubuli are rising from the channels and entering into the matrix. By using a magnifying power of 750 (Fig. Xb) it was found that these tubuli contain very small and delicate fibres rising from the endothelial cells of the canal.

Fig. XI. Longitudinal section of a young, not fully developed tooth ; on the left side is pulp tissue, covering this a layer of very significant odontoblasts, which have already produced a thin cap of dentine, over which enamel epithelium is to be seen.

Fig. XII shows a part of the last preparation, but nearer to the apex of the tooth, magnified 750 times ; two large cells lying in a vasodentine canal send fibrils into the true dentine.

As the result of my investigations, I came to the conclusion that the central part of the crown of the pike's tooth is true vasodentine. It contains not only in every channel a blood vessel, but it shows also dental tubes which have not so regular a shape as the ordinary dental tubes, but they contain soft fibrils rising from cells which are similar to the odontoblasts ; these tubuli are much more clearly seen in preparations not decalcified, like Figs. III and V. This tissue has therefore more relation to dentine than to bone, and I think the designation vasodentine is more justified than osteodentine.

The statement of the correct nomenclature is important for the pike's tooth, because this tooth, or rather its central part, was given as instance of osteodentine by Mr. Ch. Tomes in his classification of the different kinds of dentine.

Although I highly respect Mr. Tomes as the best and most

experienced judge in dental anatomy and dental structures, I cannot agree with him in four points, which, for the want of time for a longer discussion I will publish in the "Transactions."\*

MR. F. CANTON said he had had an opportunity of examining Dr. Sternfeld's beautiful preparations, and could state that they were well worth seeing. He would have asked Dr. Sternfeld to read a paper on the subject, but unfortunately he would not be in England at the date of the next meeting of the Society, so he had been asked to place the results of his investigations before them in the present form.

MR. CHARTERS WHITE said he had also inspected them, and had admired the extreme care with which they had been prepared. So far as he had been able to examine them, they appeared to bear out the correctness of all that Dr. Sternfeld had stated in his description.

At the request of the President, Dr. Sternfeld kindly undertook to obtain the plates of the figures to illustrate the report of his communication in the "Transactions."

DR. STERNFELD then read the following notes of a case of very large fibro-cystic tumour of the lower jaw, and showed photographs of the patient before and after the operation.

The patient was a countryman, 33 years of age; four years before he got 'quite spontaneously' a small ulcer of the gum covering the alveolus of the left lower wisdom-tooth; he suffered also great pain, for the relief of which all treatment was ineffectual. At the end of a year a swelling appeared on the place referred to, which during the next two years increased very slowly, but in the last year it grew so quickly that the tumour reached the size shown in the illustration. The acts of masticating and swallowing became exceedingly difficult, sometimes the patient suffered under great troubles of breathing, and he therefore readily consented to the performance of any operation.

\* It was found impossible to prepare the plates referred to in this communication in time for the present issue of the "Transactions;" we hope to be able to include them in the next number.

The examination showed that a great part of the left half of the lower jaw was surrounded (included) by the tumour, and that it was impossible to save the jaw ; it was therefore decided to remove this half of the jaw with the tumour by exarticulation.

This operation was performed by Prof. von Nussbaum, in Munich, in January, 1879, the patient having been photographed the day before. The jawbone was sawn through between the left canine and the first bicuspid ; the soft parts were saved as much as possible, and the free end of the remaining half of the lower jaw was fixed in a good position by a silver wire going through the bone of the jaw and around the *arcus zygomaticus*. The whole wound was closed very carefully by sutures, and the discharge of pus was facilitated by indiarubber drainage.

The act of healing was almost quite normal, only for a few days there was an erysipelas, and when, thirty days after the operation, the patient left the Hospital, the wound was almost healed.

Seventy-five days after operation a small sequestrum was removed ; and after this event the wound was perfectly healed in a very few days.

On the seventy-ninth day after operation I saw the patient again to be photographed. He was very satisfied ; the disfigurement of his face was now very slight. Masticating, swallowing, and speech were very satisfactory ; the silver wire, which was firmly included by the cicatrix, did not give the slightest trouble.

According to a communication received from the patient on the 8th inst., his general condition is good ; speech and mastication are very satisfactory, and although three years have elapsed since the operation, no recurrence has taken place.

MR. HOWARD MUMMERY, as Secretary for Foreign Correspondence, then read the following abstract of a paper forwarded to the Society by Mr. Dunn, of Florence :—

*Abstract of a Paper, entitled “A Study on Diseases of the Teeth.” Read by Mr. C. W. Dunn, before the Anthropological Society of Florence.*

AMONG civilized nations, diseases of the teeth have been, apparently from remote times, a great source of human suffering.

Travellers are unanimous in asserting that among barbarians and half-civilized races, the teeth are nearly always good, while among civilized races we know only too well how widely disease has spread. What are the differences in the habits of civilized and savage races which lead to this result ?

Savage man, in the first place, lives much in the open air, and his body is always accustomed to fatigue ; his food is obtained by hunting, his organism is healthy, and his nervous system is but little excited by mental study. His food is not adulterated, his digestion, thanks to constant exercise and pure air, is good, the secretions of the mouth and stomach are healthy, and the teeth are generally clean. His forefathers and parents have had good teeth, and his food is hard, tough, and resisting.

Civilized man, especially if born in cities,

breathes from his first moment vitiated air ; 100, 200, or 500,000 persons occupy a space which amongst savages would be inhabited by one or two families only. Exercise is not necessary to procure his food, which by means of commerce is brought to him. The citizen is rarely a robust man, his organism is weakened, the brain especially is fatigued by constant study ; the food he eats is adulterated, many nutritious parts being removed (as, for instance, the bran of the wheat, which contains the substance most necessary for the formation of bone). His digestion even in early years is not good, the secretions of the stomach are unhealthy, and the teeth rarely clean. His food is soft, tender, and little resisting.

But among civilized races, some have their teeth more, and some less diseased : many various hypotheses have been formed as to the causes of this difference.

Climate by some is said to produce caries ; this is much to be doubted, when we reflect upon the conditions of the teeth among uncivilized peoples under all extremes of climate. In the Arctic regions, where the thermometer descends sometimes to  $45^{\circ}$  or  $59^{\circ}$  below zero (Cent.), the inhabitants have beautiful teeth.

It has been observed by the President of our Anthropological Society, and by M. Sommier, our associate, that the Laplanders have exceed-

ingly good teeth. Lieutenant Bove says the same of the teeth of the Tchitetchin, that nomadic people who inhabit the country north of Siberia, touching the Arctic Sea; these people live in tents in the winter, without either charcoal or wood for warming, with the snow three, five, and six metres deep for nine or ten months of the year.

Under the Equator, where the thermometer marks from  $50^{\circ}$  to  $60^{\circ}$  Cent., we find equally good teeth. In the temperate zones, as the Cape of Good Hope, the southern parts of Australia and New Zealand, the natives have all good teeth.

In the United States, where there is every possible climate, there are three distinct races: the Whites, the descendants of the Europeans; the Moors, the descendants of the Africans; and the Red Indians in small numbers, living in the western part in a savage state.

Amongst the Whites in all parts, the teeth are of the worst quality; of the Blacks, those who work in the fields have good teeth; those in houses, as servants, suffer from caries. The Red Indians have perfect teeth.

The air of certain localities is said to have an injurious influence on the teeth—sea air is said to be deleterious. Eating meat and sugar is also given as a cause of caries.

Reflecting on the uncertainty attending these hypotheses, it occurred to my friend and colleague,

Signor Calvetti, and to myself, to print a series of twelve questions, and distribute them to the communal doctors, in the most remote and little known parts of Italy.

We have sent out about 300 copies, and have received as yet 44 answers—a small number certainly on which to form any accurate idea, but the following are the results of the little knowledge we have thus gained.

Italy contains a population subject to very different conditions. On the shore of the Mainland, and of its islands, Sardinia, Sicily, Elba, they eat much fish. In the cities, many eat meat; in the country, some eat almost exclusively Indian corn flour, chesnut flour, or rice. Very many eat neither meat nor fish.

The soil also presents the greatest differences, in some parts possessing a wonderful fertility, in others just as great sterility.

We wished in this wide field for study, to know whether air, locality, mountains, plains, the vicinity of forests, marshes, mines, &c., or food or drink, produce their effect on the teeth.

The following are the twelve questions sent out:—

QUESTIONS.	ANSWERS.
1. In the locality frequented by you, which disease of the teeth predominates. Caries or Periostitis ? Do young children suffer from either of these diseases ?	1.
2. Is the population in general robust or weakly ?	2.
3. Have you been able to observe whether the teeth of those living in towns and cities are better than of those living in the country ?	3.
4. Which suffer more from the teeth, the inhabitants of the plains or those of the hills ?	4.
5. Are there mines in your neighbourhood ? Please state the nature of them ; have you been able to observe whether those working in the mines suffer less or more from their teeth than others living in the neighbourhood ?	5.
6. What is the usual drink—beer, spirits, wine, or anything else ?	6.
7. Do the people smoke much, or chew tobacco ?	7.
8. What is the usual daily food ?	8.
9. Are there forests, bogs, lakes, hills, or downs in the neighbourhood ?	9.
10. Is there a tendency in the teeth to become loose at an early age ?	10.

QUESTIONS.	ANSWERS.
11. On what soil or formation are you?	11.
12. Can you make any special observation on the formation of the enamel, the shape, size, regularity of the teeth, or any other observation which might be interesting?	12.

These have been sent throughout Italy, in Piedmont under the Alps, in the Roman and Neopolitan States, Sicily, Sardinia, &c., and some to Greece, France, Corsica, and Spain.

Of the 44 places of which we have notice, caries abounds in 22, viz., the districts of Bologna, Palermo, the Waldensian valleys, Verona, Casalecchio, Campeggine, Dronero, Nuoro, Villasor, Sassari, Portoferrago, Capraya, Sciara, Castelnuovo, Brescia, Barile (Neapolitan), Ragusa, Patras, Zante.

The causes indicated in these places are marshes, rice grounds or fields, magnesia springs, malaria, stagnant waters, great irrigation, lead mines. Scrofula, scorbutus, and anæmia predominate in these places; food often poor and scarce. In one case only, the medical man accuses iron mines of being the possible cause of the evil, though in this case there were also mercury mines in the district.

Periostitis abounds in eight places, Carpiano, Vicenza, Caltanissetta, Sciara, Patras, and Athens, and the causes indicated are malaria, marshes,

food but little nourishing, and sulphur mines in the neighbourhood.

Fourteen places are mentioned as having little caries, and where it does not exist in children ; the causes given are the presence of mineral springs of iodine, iron, and saline substances, gravelly soil, vicinity of the sea, in some parts the immense quantity of seaweed thrown up is mentioned, and the presence of sulphur mines and high mountains as causes of the infrequency of caries. There are four places where good teeth exist, Perrero in Piedmont, Bergamo, Bordeaux in France, and around Athens. In the case of Perrero—1,500 metres above the sea level—the elevation is believed to explain this, in others the presence of iron mines, lignite, &c.

All unite in saying that those who work in the open air generally suffer little, or not at all ; thus shepherds and charcoal burners do not suffer.

In the places where caries is much spread, the food consists of corn, potatoes, goats' milk, rice, Indian corn in excess, and maccaroni ; the drinks are liqueurs, rum, wine, beer.

Where good teeth exist, they eat rye, eggs, cheese, ravigginolo, fish, wheat, salame, little meat ; they drink wine, rarely spirits, or water only, and smoke much.

Where periostitis predominates, they eat polenta, but little meat, chestnut flour, Indian

corn, barley bread, fruit, vegetables in excess ; they drink wine, and chew tobacco.

It is to be noted that damp places are cited as being bad for the teeth ; it seems to me, however, a mistake to believe that moisture acts *directly* upon them. It seems impossible when one reflects that the teeth are nearly always immersed in saliva ; one can very well understand, however, that if humidity in the air is injurious to health, especially to the health of the digestive organs, this would very soon have a disastrous effect on the teeth.

Switzerland, where the inhabitants suffer much from caries, would be an interesting field for study.

We are preparing for Jamaica a translation of these questions, with others bearing upon the effects of sugar on the teeth. There the negroes eat it enormously, yet all say they have beautiful teeth.

I hope also to send to Australia, where the natives have good teeth, and the Europeans suffer terribly.

From the scanty notices received, we can but ill form any precise theory. In these studies, one requires far more abundant matter than that we have been able to offer, which, however, is not without its interest, and may serve, I hope, to encourage our studies more in this direction.

## FINANCIAL STATEMENT.

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The PRESIDENT observed that Mr. Dunn had collected some very valuable information, but he thought that the ground covered by the questions might have been extended with advantage. The last question, however, invited those who answered the series to add observations of their own. He should have been glad if the paper could have been read *in extenso*, but it was a rule of the Society that communications which had already been discussed elsewhere could only be read in the form of an abstract.

MR. PARKINSON then read his report as Treasurer:—

The receipts during the past year had amounted to £557 18s. 5d., and the disbursements to £364 14s. 9d., leaving the largest surplus which he had ever been able to report, viz., £193 3s. 8d. This was partly accounted for by the unusually small amount of subscriptions in arrear, but was chiefly owing to the liberality of the President, who had paid all the expenses of the Conversazione given during the Congress week in August last, and to the exertions of Dr. Walker, who had, by careful management, succeeded in materially reducing the expenses of the “Transactions.” The assets of the Society at the beginning of this year were as follows:—

		£	s. <sup><small>old</small></sup>	d.
Stock in New 3 Per Cents...	..	1,244	14	3
Cash for Investment ..	..	300	0	0
„ on Deposit .. ..	..	250	0	0
Balance at Bank and in Treasurer's hands..	.. .. ..	378	17	4
		<hr/>	<hr/>	<hr/>
		2,173	11	7
		<hr/>	<hr/>	<hr/>

During the past year the Society had lost by death two resident members, one non-resident, and one honorary, and there had also been four resignations, one resident and three non-resident members. Against these sixteen new members had been elected, nine resident and seven non-resident, and one non-resident had been made an honorary member. On December 31st last the roll of the Society consisted of 123 resident, 210 non-resident, and 50 honorary and corresponding members, making a total of 333.

A detailed Balance Sheet is subjoined :—

Treasurer in Account with THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN,  
 for the Session ending 31st October, 1881.

Dr.	£.	s.	d.	Cr.	£.	s.	d.
To Balance at Bank, cash at Interest and in Treasurer's hands, 31st October, 1880	..	..	..	735	17	8	
Annual Subscriptions ..	..	..	..	403	4	0	
Entrance Fees ..	..	..	..	61	19	0	
Arrears of Subscriptions ..	..	..	..	39	18	0	
Sale of "Transactions"	..	..	..	10	14	6	
Interest on Stock ..	..	..	..	35	8	11	
Interest on £200 ..	..	..	..	6	10	0	
							1,293 12 1
Disbursements ..	..	..	..	..	664	14	9
Balance in hand ..	..	..	..	..	£628	17	4
							£664 14 9
							101 8 9
							13 18 6
							21 0 0
							17 15 6
							6 12 10
							27 13 0
							80 0 0
							35 8 11
							5 5 0
							6 15 0
							364 14 9
							300 0 0

MR. WEISS reported that the Library was in a satisfactory condition, although during the past year not many books had been added, as few had been published in any way connected with Dental Science either in England, America, France, or Germany. The Council had availed themselves of every opportunity of adding to the list, and Mr. Weiss was pleased to be able to state that only one book was missing, and this he expected would be returned. 135 volumes had been borrowed during the past year,—the largest number which had ever been sent out: of these 116 had been lent to the students. Arrangements had been made for the Library to be open every Wednesday evening from 6 to 8 o'clock.

Mr. Weiss took the opportunity of calling attention to the fact that there were some omissions in the catalogue which members might be able to rectify. The first volume of the British Journal of Dental Science wanted the opening numbers, and they had not a perfect copy of that interesting record "The Forceps." The Transactions of the Society of Arts for the year 1826 contained matter of historical interest to all Dental Surgeons, and should be in the Library. He should also be glad to possess a copy of Mr. Chitty Clendon's work on the Forceps, which continues the same subject. If the Library was to contain a perfect record of Dental Science, past and present, a copy of every book bearing on the subject should be in it, and the Council would feel obliged by the gift of any such volumes which were not in the catalogue.

MR. S. J. HUTCHINSON stated that the Museum was now in perfect order. The new Catalogue had been printed, and a copy would be sent to every member with the January number of the "Transactions." His own share in the production of this volume had been small, the labour of classifying, numbering, and cataloguing having been most efficiently carried out by Mr. Willoughby Weiss, and to him, to Mr. F. H. Weiss, and Mr. J. B. Magor, who had also rendered valuable assistance, he had to acknowledge his thanks.

The Scrutineers announced that the list of office-bearers recommended by the Council had been unanimously elected. It was as follows:—

## LIST OF OFFICERS AND COUNCIL FOR THE YEAR 1882.

## PRESIDENT.

Samuel Lee Rymer, Esq.

## VICE-PRESIDENTS.

*Resident*, Messrs. J. S. Turner, Chas. S. Tomes, and  
Henry Moon.

*Non-resident*, Messrs. J. E. Rose (Liverpool); Walter  
Campbell (Dundee); and Wm. Doherty (Dublin).

## TREASURER.

James Parkinson, Esq.

## LIBRARIAN.

Felix Weiss, Esq.

## CURATOR.

S. J. Hutchinson, Esq.

## HONORARY SECRETARIES.

Messrs. J. Howard Mummery (*Foreign Correspondence*);  
F. Canton (*Council*); and T. F. Ken Underwood  
(*Council*).

## COUNCILLORS.

*Resident*, Messrs. T. Charters White, G. Wallis, W. F.  
Henry, Alfred Coleman, J. Stocken, Dr. Joseph Walker,  
Isidor Lyons, G. A. Ibbetson, and Ashley Gibbings.

*Non-resident*, Messrs. T. J. Browne-Mason (Exeter); W.  
Williamson (Aberdeen); J. E. Palmer (Peterborough);  
Wm. Fothergill (Darlington); A. Jepson (Leamington);  
and Martin Magor (Penzance).

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The President then proceeded to deliver his valedictory address.

## PRESIDENT'S ADDRESS.

GENTLEMEN,

In their introductory addresses, Presidents usually indulge in hopeful anticipations for the coming year. In their farewell speeches they are wont to sum up the actual results of that year, which has then faded into the past, with its successes, its surprises, its disappointments. In former days when our Society was young and untried in public work, its actions were more or less impressed with the individuality of its rulers, but now that its course is plainly marked out and many minds are engaged in the conduct of its affairs, there is less scope for individual action; and it would be difficult for one looking through the modern history of the Society to guess at the views held by its successive Presidents. In its earlier years its objects were essentially and necessarily political; but with the accomplishment of its chief aims, the political has gradually given place to the scientific element in its constitution, and although we cannot but take great interest in events bearing on the status of our profession, we are content to subordinate that to our interest in its scientific development, which we can thus work out with undivided attention and freedom from external interruption. Possibly any great crisis in our professional history might find the Society reverting to its original function, as Napoleon resumed his practice as an officer of artillery on great emergencies; but we must hope that no external danger will arise of so grave a nature as to compel this.

We were warned at the beginning of the year, that our supply of papers would suffer by the competition of the Congress. But I think we have had no reason to complain.

The truth is that in the exhaustive pursuit of almost any branch of study so many collateral subjects are opened up that there are materials for many papers. But the competition of the numerous Dental Societies which are now forming will need all our efforts to supply the demand. I hope such as the Odontological and Odonto-Chirurgical Societies will be held to prefer the chief claim to communications of a purely scientific character. It seems to me that the various Dental Associations should rather keep in view the political and social progress of the profession, which, I think, will provide them with full occupation, at least for some time to come.

Our papers for the past year may be classed under two heads: General—on subjects more or less intimately connected with Dentistry; and Special. Of the former, Mr. Macnamara read one on Sarcoma, which very well illustrated the necessity for surgical knowledge on the part of the dentist, and the desirability of an acquaintance with dental subjects on the part of the surgeon, an acquaintance evidently possessed by Mr. Macnamara. We shall not soon forget Mr. Charters White's beautiful microscopic preparations of the taste-bulbs, illustrating his paper on the "Histology of the Gustatory Organs of the Tongue," whose only fault was its brevity, leaving us longing for more. Perhaps Mr. White may be induced to gratify the wish of the Society for a further contribution from him. Mr. Kinsey's paper on the "Oral System of Teaching the Deaf," though not so closely connected as these with Dental Surgery, was full of interest, and very gratifying, as showing how much is being done for a class of most unfortunate people.

Of the special papers we may welcome Mr. Stocken's "On Constitutional Remedies in the treatment of certain Dental Affections." I have always thought pharmacology too much neglected by us. Mr. Stocken has, on various occasions shown himself thoroughly master of this subject, and I hope

the Society will have further communications of the kind from him. Mr. David Hepburn's paper treated of those troublesome cases of suppuration having a dental origin, which we used generally to relegate to the surgeon. But more properly they are dental cases, and Mr. Hepburn showed us clearly how dental surgeons should deal with them. Dr. Richardson, who always tells us something worth hearing, took us over a good deal of ground, and I think we could agree with most of his conclusions. Dr. Richardson is practical, if you please, but philosophical above all things, and his remarks upon the origin of disease were, to me, the most interesting part of his paper. Mr. Coleman has made the subject of anaesthetics completely his own, and at our last meeting he showed us a method of manufacturing nitrous oxide gas, both simple in its nature, and by which so large a pecuniary profit could be made on the other products of the manufacture, that the gas itself would be obtained free of cost. It might scarcely be desirable to carry this out in private practice here, but in charitable institutions and in parts of the world to which the gas has to be exported, and the trouble and cost of obtaining it must therefore be considerable, a process such as Mr. Coleman described seems worthy of adoption. Mr. Dunn has propounded a series of questions concerning the causes of dental caries, which can probably be better answered by dentists than by surgeons, to whom they were chiefly addressed. They are also capable of extension, as has been suggested in the discussion this evening. The minute organisms to which so many diseases are now being traced, seem destined also to play a part in the causes of caries. Pasteur and others have shown that these organisms can be subjected to cultivation or "attenuation," as it is termed, in such a way that inoculation with the resulting organisms causes a modified form of disease, with more or less immunity from future attacks, just as vaccination affects small-pox. I believe I am correct in saying that the results of these

researches are considered likely to affect almost all, if not all epidemic diseases, and some—as hydrophobia—which are not epidemic. We have all heard of that king of Pontus who had rendered himself invulnerable to poisons : and it may come to pass that the early youth of future generations may in like manner be chiefly spent in undergoing a series of inoculations against all the epidemic ills to which flesh is heir. Let us hope that as some compensation there will also be a return to the patriarchal ages reached before the flood. I feel sure we, or at all events our successors, will all be pleased if the dental organs partake of the general patriarchal nature.

In addition to the papers, there have also been many very interesting casual communications, but the time allotted for an address does not admit of further allusion to them. I may, however, draw attention to Mr. Sewill's cases this evening, upon which more than one paper might be written ; and to Dr. Sternfeld's beautiful microscopic preparations. I should be pleased to see Dr. Sternfeld a candidate for the membership of the Society. From a practical point of view the casuals are often quite as instructive as the more formal papers. There appears to me to be a marked tendency in the Society of late years to cultivate the surgical side of our profession—that I mean which relates to the treatment of the natural teeth,—and the communications on such subjects seem in far larger proportion to those on mechanical dentistry than was formerly the case. Is this a shadow of a coming event ? Does it foreshadow a separation of the two branches ? And if such a separation were to be brought about, what results would follow ? But this is much too large a subject for an address like the present. And moreover, I find myself—instead of keeping to the retiring President's part of *laudator temporis acti*,—becoming *avidus futuri*.

In the early part of the year a long-pending question

was decided ; and the “ qualification law ” will come into operation next November. The question was one upon which widely differing views were held, both as regards the necessary qualifications for membership, and the desirability of agitating it at a time when our undivided energies were needed for the coming Congress. I could not help thinking it a somewhat strange coincidence that this should have been the very last subject on which I was occupied at the conclusion of my first Presidentship, and that it should be the very first to engage my attention at the commencement of my second tenure of office, fifteen years having meanwhile elapsed. It is some consolation to feel that it must have been thoroughly threshed out. I should like to mention that the 5th June will be the last occasion on which undiplomaed candidates can be elected, and that therefore all such as may be desirous of joining us must be proposed not later than the 6th March. My reason for thus publicly mentioning this is that there appears so much misunderstanding always in connection with “ years of grace ;” and so many persons seem to become suddenly desirous of availing themselves of them just after their termination, and then consider themselves greatly aggrieved because the clock cannot be put back in order to make up for their negligence.

You have heard the Reports of the Treasurer, the Librarian, and the Curator. They all show that we are doing good work in every department of the Society, and they also show what a large field the Society covers. Perhaps no one knows so well as I do what great obligations we are under to those gentlemen and to our Secretaries and the Editor of the “ Transactions.” None of these offices are sinecures, yet their holders render us their great services energetically and cheerfully, and consider themselves sufficiently rewarded by our thanks. This year the Museum has been re-organized, and the Curator has had a very anxious time. I need scarcely say he could not possibly have done what has been done

unaided, no man in active practice could have given the necessary time. But he has had most intelligent and unresting help from the Messrs. Weiss, the sons of our Librarian, especially from Mr. Willoughby Weiss, and I have no hesitation in saying that our Museum and its descriptive Catalogue now just published are perfect models of that which a Museum and Catalogue should be. I would recommend you to go upstairs after the meeting, and you will be pleased with what you see, and will understand our obligations to Mr. Hutchinson and his fellow workers.

During the past year we have been joined by sixteen new members. Four have resigned, of whom one, Mr. Hepburn, of Edinburgh, has been re-elected as an Honorary Member, and four have died. Mr. Norman King, of Exeter, died in 1879, too late for his death to be noticed by Mr. Woodhouse. He joined us in 1863, and came on the Council in 1866. He was a J.P., an Alderman, and Mayor of Exeter. His reputation extended far beyond the city in which he practised. Mr. Isaac Sheffield was one of our earliest supporters. He became a member of the Council in 1861, Vice President in 1863, and President in 1873. He was too diffident to speak often, but commanded attention when he did speak. He was one of our very best operators, a man of refined taste in art, and was highly esteemed by those who enjoyed his friendship, and who recognised under his reserved manner his genuine goodness and truth. Every one who knew him sincerely regrets his loss. Mr. Normansell was also among the first of our members, but he always declined to hold office, though frequently invited. He was a thoroughly practical dental surgeon, one of a school fast passing away. He fully recognised the necessity of dental reforms, and was a constant though silent supporter of them. Mr. Virgin, of Oxford, had been a Member of the Society for several years, but did not take any active part in its proceedings. Mr. Napier was formerly a Member of the Society, but left us in 1863, when

the amalgamation with the College of Dentists took place. A few years since he originated a new Dental Association of a somewhat exclusive constitution, and in doing so acted consistently with the views he appears always to have held, and he is therefore entitled to our respect, however much we may, many of us at least, have differed from him. Those who knew Mr. Napier held him in regard and esteem. One of our oldest corresponding members, Dr. Tucker, of Boston, America, has just passed away at the ripe age of 81. I remember to have seen in my early practice very good work from his hands. He was much esteemed in his native country. I cannot conclude this, the saddest part of my address, without alluding to a loss our profession has sustained by the death of one from whom, although yet young, all who knew him anticipated great things. He had not, indeed, yet become one of our members, but there must be many here to-night who recollect Mr. John Crooks Morison as a student within these walls, and who will remember his gentle unassuming manner, his ever cheerful readiness to render assistance, his quiet self-confidence, giving confidence to others. I may add that at his examination for the dental licence he was one of the highest of a large number of candidates of an unusually high standard. I trust the Society will pardon me for the digression. Those who knew Mr. Morison I feel sure will do so.

I think I have made mention of the chief matters of interest which have occurred within our Society. But the Odontological Society is so eminently the representative body of the Profession, that it is in some manner affected by almost every event in which the Profession is concerned. And whilst I will be as brief as possible I will not offer any apology for making a few further remarks upon subjects with which we are all to some extent concerned. This has been a very eventful year for the dental profession, and great activity has prevailed in every part of it. Its literature has

been enriched by the contributious of Mr. Oakley Coles, of Mr. Coleman and of Mr. Arthur Underwood, I had hoped to be able to add, of Mr. Charles Tomes, whose works resemble those of our modern naval architects in this, that they are always in danger of being antiquated soon after they are launched, by the researches of their authors. An addition has also been made to our periodical literature : and the "Dental Record" justifies its existence on the plea that the development of the literature of a body is in proportion to its educational advancement. This is perfectly legitimate ground to take, and I trust the educational advancement of English dental surgery will prove itself equal to sustaining one fortnightly and two monthly journals. I had hoped the number of thoroughly educated practitioners now existing would justify the institution of a quarterly journal, appealing to the highest intellectual tastes and political and social aspirations.

Mr. Charters White has been elected President of the Quekett Microscopical Club, a position which such men as Lionel Beale, Huxley, and Cobbold have felt it an honour to fill, and which is most worthily upheld by Mr. White. Mr. Edwin Saunders was elected President of the Metropolitan Counties Branch of the British Medical Association ; and if we had been asked to select one of our members for this dignity, our choice would probably have fallen upon him. He is, so to speak, a "born President," and whether he presides over a scientific meeting or a social gathering he is distinguished by his courtesy and his cordial hospitality. But my object is less to express approval of Mr. Saunders' qualities, which, indeed, need no approval from me, and least of all here, than to give voice to our sense of the compliment paid to our branch of surgery in his person by his election to fill this post. And when we read the names of his predecessors—of Andrew Clark, John Wood, and Habershon, we cannot but feel gratified. There is scarcely anything more likely to raise dental surgery in the estimation of the

medical profession than the occupation of such distinguished positions as these by members of our branch of it.

But the great event of the year has been the Medical Congress. And I am obliged to confess that I find this the most difficult subject of my address to treat. The mere passing in review of the papers read would be out of place here, and, indeed, hardly possible. In truth we are still too much within the blaze of its light to be able to take a calm view of its effect. The actual and intimate contact with distinguished men from all countries whose names are as household words with us, the clash of old with new ideas—the comparison of different theories and of different modes of operating, all conspired to place dental surgery in a completely new position; and beyond doubt we have passed through a critical period in our history of whose ultimate effects we cannot yet form a just estimate. We must increase our distance from it before we can find a fit stand-point whence to depict it. We shall, probably, each of us be most permanently impressed with that one of its aspects which most nearly affected ourselves—whether its philosophical, its scientific, or its practical aspect. For my own part, and I think I shall, perhaps, express the feelings of those of my generation who have helped to bear the heat and burden of the last quarter of a century,—for my own part I shall bear in chief remembrance the clear yet profound exposition of his views upon dental education and its relation to general medical education so ably put before us by the chief actor in our great educational movement. I trust those views will be as carefully studied, and their great importance as deeply felt, by the younger as they have been by the older members of the profession, and that our successors will follow the lines there laid down and will hold firmly by the licentiatehip, the outcome of the labours so persistently pursued by the generation now passing away, and the most trustworthy evidence of our professional competency. But in whatever light we may individually

view the Congress, we, as a Society, may well be proud of this, that we have been the principal agent in bringing about such an advance in the position of dental surgery, that a Dental Section had become possible in a Medical Congress. And the fact that in England, first of all nations, has our profession been thus fully and publicly recognised as a department of medicine, places English dental surgery in the very van of progress.

To-night, gentlemen, we enjoy the first fruits of our new law, which enlarges our choice of Presidents, and I congratulate the Society on its first choice. Mr. Lee Rymer was one of the very foremost leaders in the great movement of six-and-twenty years ago ; and his high professional position and great administrative abilities justify us in expecting a successful year under his Presidency.

And now, gentlemen, the time has come for me to take leave of you. And as in all probability this is the last time I shall ever address my brother practitioners in public, I may be excused if my words have some tinge of sadness in them. From the first Council of the Society, when my name was last and lowest on the list, and was too much honoured in having any place there, to this present Council, when for the second time you have accorded me the highest rank in it, I have received nothing but kindness and consideration from you, which I can have deserved on no other grounds than those of a sincere and earnest desire to do what I believed to be my duty towards our profession and our Society. Some of my closest friendships have arisen out of my work here, and many are the pleasant associations in connection with the Odontological Society which I shall bear away with me and hold in remembrance so long as memory lasts.

MR. G. A. IBBETSON then rose and proposed a vote of thanks to the retiring President, in the following terms :—

GENTLEMEN—I am sure that all will agree that our President has entitled himself to our warmest thanks and gratitude for the able way in which he has discharged the duties of the chair during his year of office. The meeting of the International Medical Congress in London made it very desirable that the chair should be filled by one whose name should command respect, and whose personal character entitles him to esteem and regard ; it would have been impossible to select one who more happily combines these valuable qualifications than Mr. Rogers. It is not therefore surprising that, during such an exceptional year as that which has just terminated, with a President so highly endowed, and of such ripe experience, the members of the Society looked forward to his discharge of the Presidential duties with “great expectations,” and now, upon his retirement, all will agree that, taking a retrospective glance of the past, such expectations have not been disappointed.

It must be admitted that our President has been singularly fortunate, in having had a noble example set him by his estimable father, whose zeal and devotion to his profession were beyond all praise ; the deep interest which he took in his work was nothing short of patriotic, and he laboured during his whole life for the advancement and elevation of our calling. This is neither the time nor the place for a panegyric upon the late Mr. Arnold Rogers, but as the father of our President, I may be allowed to pay this small tribute to his memory.

Much has been said about the force of example, and all who have observed, must have noticed that the highest aspiration of the son appears to be to emulate the laudable example of the father.

Certainly no pains, exertions, or expense have been spared

by our President to discharge his duties in such a way as to raise the Society and the profession to a position of dignity and honour, and thereby entitle the members of it to respect. With this view a happier thought could scarcely have suggested itself to his mind, than the brilliant reception he gave at the Marlborough Rooms on the eve of the meeting of the International Medical Congress; to dilate upon the widespread invitations, the profuse hospitality, the hearty welcome, and the elegant nature of the entertainment, is needless, as most of you were present on the occasion. The other duties of the office have been discharged with great ability, and in a way calculated to reflect the greatest credit upon Mr. Rogers. I am sure, therefore, that I am only expressing the sentiments of all present, when I say that the retiring President has adorned the Chair and entitled himself to our lasting gratitude. I believe his richest reward will be to receive your assurance that he has deserved well of the Society, an assurance which I am quite certain we shall be unanimous in offering him, accompanied with a hope that he may ever look back to his second Presidency of the Odontological Society with feelings of unqualified pleasure and gratification.

Gentlemen, I propose a hearty vote of thanks to Mr. Rogers for the way in which he has discharged the duties of the Chair.

MR. J. R. MUMMERY said it gave him great pleasure to second the resolution, but after the excellent speech of Mr. Ibbetson there was no need for him to say much. No one could revere more highly than himself the memory of the late Mr. Arnold Rogers, from whom he had received great kindness in his early days. The son had, indeed, followed closely in the steps of the father, and general regret had been expressed when some years ago the President had been compelled to give up practice owing to failing health. He was rejoiced, however, to find that Mr. Rogers in his retirement had never lost sight of the proper utilization of his time, and that his strength had been so far restored that he had been able to fulfil the duties of President, to the great advantage of the Society and satisfaction of its members.

The resolution having been carried with much applause,

The PRESIDENT said he felt very deeply the compliments which Mr. Ibbetson and Mr. Mummery had paid him, and the kind manner in which the members had received these remarks. He felt that to have been President during the year which was past was, indeed, a thing to be proud of; and if anything had been needed to add to his pleasure, it was the confidence reposed in him in leaving the management of the Society's public welcome to their visitors during the Congress entirely in his hands. He was sure they would feel the same pleasure that he did on being told that the introductory conversazione made all our guests feel quite at home during the rest of their stay. He should much like to have the honour of associating with himself in this vote of thanks the Executive—as he might term them—of the Society; those, namely, who filled the chief working offices; since without these gentlemen the President would be nowhere, and the Society would not be anywhere. In the first rank he would mention their Treasurer, who was perhaps the most important member of the Society, and whose office it was most undesirable should be subject to frequent change. There had been only four Treasurers since 1856,—Mr. Saunders, Mr. Arnold Rogers, Mr. Harrison, and Mr. James Parkinson—and he hoped it would be a long time ere they had a fifth. They all saw the *results* of the labours of the Librarian, the Curator, and the Editor of the “Transactions,” but what they saw in such good working order and excellence was the outcome of an amount of work which few were aware of. As regards the Secretaries, he had known personally almost all the Secretaries from the beginning, and he could say that whilst there had been many equally good, there had never been any better. As one, and only one, instance of their earnestness, he might mention that the minutes of the Council Meetings were always on his breakfast table at 8·15 the next morning ready for his perusal. Those of the Ordinary Meetings could not, of course, be thus treated, but had it been possible he was sure it would have been done. The very best thanks of the Society, and of himself, were due to all those gentlemen for their labours

during the past year; and he begged to return his own warmest thanks to the Society for its support and forbearance to himself during what had, undoubtedly, been a very anxious year of office.

MR. PARKINSON said that of course the business of a Society such as theirs could not be carried on without some amount of trouble to those who undertook to manage its various departments; but he was sure he could say, both for himself and his colleagues, that these services were cheerfully given, and would be so given in future so long as they were appreciated as they had been by the members generally. For himself he had been a member of the first Council, had taken an interest in the Society ever since, and should be glad to serve it as long as he could be of any use.

Messrs. WEISS, HUTCHINSON, and CANTON briefly returned thanks, and the President then adjourned the meeting.

# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*February 6th, 1882.*

S. LEE RYMER, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed,

The PRESIDENT announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz., Messrs.

FREDERICK NEWLAND PEDLEY, M.R.C.S. and L.D.S. Eng.,  
242, Camden Road, N.W.

WILLIAM HENRY KEY, L.D.S. Glasg., 14, West Parade,  
Rhyl, North Wales.

THOMAS EDWARD KING, L.D.S. Eng., Coney Street, York.  
E. LLOYD WILLIAMS, L.D.S. Eng., 2, James Street,  
Buckingham Gate, S.W.

GEORGE HARRIS DOWSETT, 1, Gloucester Street, Portman  
Square, W.

GEORGE CUNNINGHAM, D.M.D. Harvard, York Row,  
Wisbech.

MR. CHARLES EDWIN TRUMAN, M.R.C.S. Eng., of 23, Old Burlington Street, was then balloted for and unanimously elected a member of the Society.

MR. S. J. HUTCHINSON announced that Mr. Barnby, of Bradford, had sent a model showing a geminated left upper lateral incisor, taken from a young gentleman 19 years of

age. He also announced that Dr. Sternfeld had presented to the Museum a selection of his beautiful microscopic specimens.

MR. HENRY SEWILL showed a cast of the mouth of a child, 9 years of age, showing a supernumerary lateral incisor so like an ordinary lateral, as to be quite undistinguishable. It was, in fact, quite impossible to say, from the appearance of the teeth, which was the proper lateral, and which was the supernumerary tooth. Mr. Sewill had therefore decided to leave both in place until the canine appeared, and then act according to circumstances.

He next showed some sections of teeth from the apical foramen of which a small portion of barbed root-extractor projected. In one case the patient came to him suffering from acute periostitis of an upper lateral incisor which had been filled a short time before by a practitioner of some eminence in the provinces. Mr. Sewill extracted the tooth, and then found out the evident cause of the periostitis. Another section was that of a lower bicuspid which gave evidence that the same accident had occurred in its case. The same thing had occurred in his own practice. He was clearing out the root canal of an upper canine, which he showed, when the extractor caught and broke off. He tried to recover the broken fragment, but failed, and then advised the patient to have the tooth extracted. He then found that the nerve extractor had passed through the apical foramen.

It was not only a very uncommon occurrence for these instruments to break, but he was generally able to extract the fragment without much difficulty by passing up another broach with a little cotton-wool loosely twisted round the end of it; this would catch the broken fragment, and it could then be drawn out.

He would take that opportunity of calling attention to a communication recently made by M. Magidot to the French Académie de Médecine, in which he stated that alveolar periostitis was always met with in the mouths of patients suffering from Diabetes Mellitus, and was therefore of great

assistance in forming a diagnosis of that disease. He had himself met with two cases which appeared to bear out the correctness of the observation. In one of these, a young lady suffering from diabetes who had been sent to him by Mr. Napper, of Crawley, had lost several teeth, and others were being shed, owing to inflammation and rapid absorption of the alveoli. In the second case, a lady who was under the care of Dr. Pavay, the patient had lost nearly all her teeth from the same cause during the progress of the disease. He should be glad to hear if other members had met with the same experience.

He would also mention a case of some interest which had lately occurred in his own practice. A young gentleman, aged 20, very nervous, came to him to have a small cavity filled in an upper molar—a far from painful operation. But whilst he (Mr. Sewill) was preparing the operation the patient had a short, but distinct epileptic attack; he was slightly convulsed on the right side, jaws were clenched, and the breathing was stertorous; the attack passed off in perhaps a minute. The patient had a similar attack a few minutes later, after which Mr. Sewill was able to complete the operation without further interruption. The patient came again a short time afterwards suffering from severe neuralgia of the inferior dental nerve, not due to any affection of the teeth. Mr. Sewill advised him to consult Dr. Ferrier, and he hoped to have his report of the case later. A case of *petit mal* of the same character had lately been reported in the "British Medical Journal," by Mr. Draper; the attack was then brought on by the passing of a probe into the lacrymal duct. The point of importance was that epileptic symptoms in the early stage of the disease were often unrecognized by the patient and his friends, and if dental practitioners met with such cases it was their duty to give timely warning to the persons concerned.

MR. COLEMAN said the case which Mr. Sewill had just related reminded him of one which had occurred in the practice of his colleague, Mr. Lyons, in which the patient

had an epileptic fit each time an exposed nerve pulp was touched ; the pulp was touched three times, and a fit occurred each time. He had, in the course of his experience, met with several cases in which an epileptic fit had occurred just after an extraction without gas, but he had never met with one in a case in which the gas had been given, though one would have thought that the state of venous congestion brought about by the gas might have predisposed to an attack in patients who were liable to them.

MR. CANTON said one patient of his had an epileptic fit just as he was recovering from the effects of the gas. He had had fits when a child, but had not had any for a long time previous to this one.

MR. TURNER said that the breaking of a nerve-extractor was an accident which had occasionally happened to him ; for instance, the anterior fang of a six year molar was very difficult to clear properly, and it would sometimes happen that the instrument caught, and on withdrawing it you found that part had been left behind ; but he could not say that he had ever observed any bad effects to result from this.

With regard to Dr. Magitot's communication, he thought that the association of alveolar periostitis with diabetes could be nothing more than a coincidence. Certainly he had seen cases of diabetes in which the gums were quite sound, and also cases of alveolar periostitis in which there was no diabetes. He had under observation at the present time a case of diabetes, so far advanced that he feared the patient would not live long, but the gums were healthy enough.

MR. HENRY MOON said he could not agree with Mr. Turner as to the harmlessness of leaving the point of a nerve-extractor in a tooth. If it should happen to be in contact with a portion of undevitalized nerve tetanus might result ; Mr. Tomes had recorded such a case. In such cases, if he failed to recover the broken fragment, he always thought it

right to acquaint the patient with what had occurred, and to advise extraction.

The last case mentioned by Mr. Sewill reminded him of a remarkable case of epilepsy due to dental irritation which had come under his notice. He was consulted about a girl aged 21, a patient under the care of Dr. Hilton Fagge. She had been subject to fits from the age of 14, and latterly they had been so frequent as to reduce her almost to a state of imbecility. On examining her mouth he found several sources of dental irritation; these were gradually removed, and the girl greatly improved, but the fits continued. On searching for some further cause, Mr. Moon noticed a wisdom tooth in process of eruption; this was freely lanced, and the girl was at once freed from her attacks. She remained under observation for a year, but the fits did not recur.

MR. F. J. BENNETT said he had seen it recommended that if the point of the nerve-extractor could not be removed in the way Mr. Sewill had described, a drop of strong nitric acid should be applied, and the root then plugged with wax or osteo.

MR. GADDES said that some three or four years ago he had the misfortune to break a nerve-extractor in the root of a lateral incisor; having tried to extract it, but failed, he pumped in some thin osteo, and subsequently filled the tooth without any bad results.

MR. SEWILL replied that leaving a small piece of steel in a root canal, if the nerve had been previously destroyed, could not cause any harm; but in the cases he had brought forward the barb had protruded through the apical foramen into the alveolar, where it had set up intense inflammation. He had been much interested in the case related by Mr. Moon, for up to the present time he had not met with a single recorded case of epilepsy dependent on dental irritation.

MR. BROWNE-MASON showed under the microscope a section of two geminated molars (2nd and 3rd), which had been

prepared by Dr. H. Gibbes; the uniting medium was apparently cementum.

DR. CAMPBELL exhibited and gave a description of his "New Mode" Vulcaniser.

The PRESIDENT then proceeded to deliver his Inaugural Address as follows :—

## PRESIDENT'S ADDRESS.

YOU will, no doubt, remember, Gentlemen, the qualities of an ideal President as pourtrayed by a skilful delineator in reference to, and on the occasion of, the retirement of one who recently filled the office in strict accordance with the model presented to our notice.

A study of the qualities then mentioned is, at present, of especial interest to me, occupying as I do for the first time, by your distinguished favour, this post of honour. In the discharge of the duties with which you have entrusted me I shall endeavour to bear well in mind the characteristics described,—characteristics which have been so conspicuously exemplified in practice by my predecessors.

To be “ sparing in speech ” was pointed out as an essential element. I hope, therefore, on the present and future occasions to condense my observations within due limits.

Briefly, then, but nevertheless sincerely, permit me to express to you my warm acknowledgments for conferring upon me the highest office in the Society,—an office which, having regard to the eminence of the men who have previously occupied it, and also to the great position to which the Society itself has attained, scientifically as well as socially,—bestows upon its incumbent a rare distinction, and one which by no means terminates with the year, but which, on the contrary, may properly be described as perpetual.

The amended bye-law which enables the Society to occasionally elect the President from amongst the provincial members has been primarily put in force in my appointment, a fact which is an additional cause of gratitude on my part.

Independently of personal considerations I cannot but

congratulate the Society on having opened up this high office to gentlemen residing at a distance from the metropolis: upon our roll of members are to be found the names of not a few practitioners, possessed of intellectual attainments of high order, well qualified to fill the presidential chair. In the earlier years of the Society's existence it would have been exceedingly inconvenient for the President of the day to have been non-resident. The period was then one of warm contention as to the policy which was best calculated to promote professional interests in the future and—as is well known—the Odontological Society espoused the side which ultimately prevailed, whilst the College of Dentists supported the proposal of an entirely independent organization. With a vivid recollection of the years of anxious toil, on either side, which preceded the settlement of the question at issue, I know that the work necessitated such frequent meetings and anxious consultations of the first importance, as to render it imperative for the President to be always available at headquarters, so that in an emergency his aid could be readily secured. Such a state of things no longer prevails. The Odontological Society is, happily, not troubled with any political controversy to interfere with the steady course of scientific investigation. The meetings are held at stated, convenient, and not too frequent intervals, thus—with the travelling facilities of the present day—we may confidently expect to see, from time to time, worthy brethren from afar occupying the presidential office with but little inconvenience to themselves and none to the Society. Of these some are so eminent that they might well have been expected to precede me, and for that reason I should have hesitated in accepting the honour of election as the first provincial President, had it not been made clearly apparent to me that the generous impulse of the members, both metropolitan and provincial, prompted a desire that I should do so. The compliment thus paid, I can assure you, is fully appreciated, especially as

recognizing the rectitude and importance of work in years gone by undertaken by many earnest men of whom I am in a measure representative.

The events and times of the past, as bearing upon the improved *status* of the profession of dental surgery, have been fully recorded by Mr. Alfred Hill, and the salient points have previously been described with such graphic and impartial accuracy from this chair, as to render it unnecessary in me to take up time by any lengthened allusion to the reform movement of 1856 or to the history of subsequent proceedings; nor should I have made reference thereto at all but for the desire to speak upon a point which I believe was of supreme moment in determining the beneficial results which followed—I allude to the amalgamation of the Odontological Society and the College of Dentists, which took place some twenty years ago: a very slight sketch of the proceedings leading to this point is here needed to render the position clear.

The College of Surgeons, after long deliberation, and now armed with legislative power, had come to a definite conclusion that it would tend to the public advantage to grant diplomas in dental surgery according to the well known Memorial of 1856. The announcement of the fact, together with the publication of the Code of Regulations, was naturally hailed with gratification unalloyed by the Odontological Society, which had worked so zealously in the cause. To the party on the other side, represented by the College of Dentists, it came somewhat as a surprise, because it was then believed that too strong a feeling existed in the medical profession generally against the institution of examinations and the issue of diplomas in specialities of any kind either by the college of surgeons, or other similar licensing body, to permit of such a course. As a matter of fact, however, the proclamation was made of the recognition in due form, by the College of Surgeons, of the claims of dental surgery as a distinct branch of surgery. Its special and sharply defined features were at

the same time allowed, and an examination exactly adapted to the situation was instituted in Lincoln's Inn Fields.

The duty of those who had the direction of the affairs of the College of Dentists at this juncture became clear. To have allowed the continued existence of the College on the basis of entire independence after the battle had been fairly fought out would, under all the circumstances, have been unwarrantable; its career could only have become one of embarrassing opposition, no longer a body helping on a good cause, it must have degenerated to a mere drag, postponing, perhaps indefinitely, the attainment of fraternal concord. The executive, understanding the importance of the crisis, placed themselves in communication with the Council of the Odontological Society, with the object of securing the Amalgamation, afterwards consummated with entire cordiality and good feeling on both sides, and which, I have no hesitation in saying, has never been for a moment regretted. The course pursued in this matter by the College of Dentists was generally admitted to be the right one, and although it necessitated dissolution, its name and objects will always be remembered with respect.

The twenty years which have elapsed since the Amalgamation have been pregnant with results of practical advantage, the most notable of which was unquestionably the passing of the Dentists Act in 1878. Had we been racked by widespread dissensions that Act could not have been secured. As matters stood the opposition to the measure arising from a small section with impracticable views, no doubt conscientiously held, became public, and this, together with far weightier obstacles, was overcome and conquered under splendid generalship.

The healthy action of the Dentists Act has already become apparent, and with each passing year its elevating influence will increase. Recognition by the Legislature being *un fait accompli*, it remains for the profession to reap the benefit.

In many respects, again, the position of the day may be regarded as satisfactory. Our educational institutions designed to provide thorough instruction are found to answer expectations as to efficiency, adapted as they are to the examinations of the now several licensing Bodies. The examinations by these Bodies are in themselves (speaking generally) so complete, as to secure for the diploma in Dental Surgery the high character it was designed to occupy, in conferring a distinct qualification independently of any other license. I may here be allowed, *en passant*, to observe that, as it seems to me—expressing only a personal opinion,—the example set by a constantly increasing number of our rising men in taking the full membership degree in surgery (or other qualifications), *in addition* to the special degree in dental surgery, points to a not unlikely future, when it will be deemed advisable to adapt the present system to one of a still more liberal and comprehensive nature, *but not at all at variance with the acknowledged authority of the dental diploma.*

The Dentists Act will require time before all its latent powers for good can become fully developed. Towards utilizing the Act to the utmost we have now established upon a sound basis an invaluable organization, the "British Dental Association," which is constituted to deal with almost any question affecting or likely to affect the interests of the profession. It is an Association which every thoughtful practitioner will do well to strengthen by becoming a member, and I shall be pleased to learn that its already influential constituency is materially augmented in number before the time of holding the next anniversary meeting at Liverpool, in August next—a meeting which promises to be most attractive.

Dental Hospitals as adjuncts to education, are indispensable—these institutions have therefore arisen of necessity, and are at the same time of incalculable benefit to that large portion of the community unable to pay for skilled professional

attendance. These hospitals are admirably managed, as are also the Students' Societies in connection with them, the latter having proved of great utility as auxiliaries to professional advancement. The talent displayed in discussion in these junior Societies is often most remarkable.

As regards the standard to which literature has attained, we have certainly abundant cause for congratulation and of pride. Of *congratulation* because in it we possess a fountain of knowledge at which may be drawn all known information of value and utility by the student, whether he be young or advanced in life. Of *pride* because in no calling has literature brought to the front more excellent examples of authorship than in Odontology. Looking back a hundred years, we find that in the course of that period, commencing with great John Hunter and continuing on to the present, there have arisen enlightened writers on this (to us) all important subject, who, each in their day and generation, have given and are still distributing to the world, through the medium of their works, grand results of indefatigable scientific investigation.

Dental periodical literature is of comparatively speaking recent growth, but with each year it exhibits increased vigour, and is destined without doubt to become an influential department.

Having glanced at some of the more prominent institutions now extant, I ask your indulgence to enable me, in conclusion, to refer to our own Odontological Society of Great Britain as a Society especially devoted to scientific enquiry, and to the promotion and dissemination of the results of advanced experience.

From its birth the Society has occupied a distinguished position in the prosecution of these noble aims, and it affords me no small gratification to be enabled to add that the sister societies of the provinces, subsequently established on the same principles, are exhibiting signs of the highest promise in a like direction.

The papers and communications originated through the instrumentality of the Odontological Society have done much—very much, towards the elucidation of truth, and the solution of difficult problems in dental science. The published "Transactions," containing the record of these contributions, are therefore properly ranked as amongst the classics of our literature.

Although the researches of the Society have extended for more than half a century over a wide range, no signs of exhaustion are apparent, evidence rather of healthy vitality displays itself as meeting succeeds meeting,—demonstrating that even in our speciality, there is no boundary to the field of scientific labour. Facts brought out in the delivery and subsequent discussion of a single paper often suggest a variety of new ideas, each one in itself capable of development. The outlook is consequently encouraging,—we need not dread the dead hand of inactivity. At the same time each one has a duty to fulfil in the maintenance and extension of the operations of the Society. It is by no means rare to come across possessors of well stored minds who regard their attainments with such singular modesty, as to induce them to shrink from publicly disseminating information, although qualified to do so extensively; thus science loses through diffidence. Diffidence is a quality to be admired in itself, but if carried to an extreme, it becomes selfish.

This Society desires its members all around to take an interest, so far as in them lies, in its proceedings. "Precept upon precept, precept upon precept, line upon line, line upon line, here a little, and there a little," the fabric of knowledge requires and, happily, attracts many hands in the rearing. Progress may be laborious, slow, and sometimes discouraging, but no worker on the grand structure may be despised, however humble he may deem his part.

Various subjects will occupy our attention in the course of the year upon which we have entered. A considerable degree

of doubt still remains as to the cause of certain of even the every day diseases of the teeth we are called upon to treat. The tissues of the body are so intimately connected one with the other, that we shall probably have to await complete enlightenment thereon until, as has been suggested, a source more remote than any yet traced has been discovered ; certainly we are on the right road, but here, as in most points of controversy, the truth can only be arrived at in the course of time, and after a patient study of accumulated facts and opinions.

Human life is known to be gradually but surely elongating —due in large measure to sanitary improvements and attention in dietetics, following greater study and enforcement of the laws of health. The eloquent letter of Dr. Farr to the Registrar-General, on the subject of the mortality in the Registration Districts of England during the period ranging from 1861 to 1870, prefixed to the “35th Annual Report of the Registrar,” published in 1875, is of intense interest as bearing upon the decrease of mortality. Dr. Farr there states (and we may take the statement as an example), that “the mortality of the City of London was at the rate of 80 per 1,000 in the latter half of the 17th century ; 50 in the 18th century ; against 24 in the present day.” Taking the mortality of all England for the ten years ending with 1879, the mortality averaged 21·7 in the 1,000. The mortality in the year 1880 was only at the rate of 20·7 per 1,000 (London suburban outer ring, 16·2).

It would be a valuable enquiry to endeavour to ascertain by comparison whether the causes tending to longevity are extending to the dental structures. The study will probably be easier a century or so hence. Had we vision to pierce the dark veil which obscures futurity, perhaps we might see in advance the members of the Society discussing this question *Anno Domini 1992.*

Minute investigation, whether present or future, must be rendered easier by reference to the fine Museum we now

possess. The very carefully arranged catalogue, a new edition of which has just been placed in the hands of each member, opens up the treasures it contains in their proper light, and our best thanks are due to all who have assisted in producing so excellent a classification. I am sure you will not consider it invidious when I say that our acknowledgments are due, in an especial manner, to Mr. Hutchinson, the able Curator of the Museum, as director-in-chief of this work.

Not long ago, at the Brighton Sanitary Congress, the assembled *savans* were told by trustworthy authorities, that there is no valid reason why men should not live comfortably for a hundred years, and the Census Returns actually show that a very much larger number of persons reach that patriarchal age than is generally supposed. (Within this past week there died at Hyde, in Cheshire, Grace Taylor, aged 105 years.)

Why is it otherwise with the vast majority? If we could obtain a satisfactory answer to this question, it would probably assist us in learning a great deal more than we know at present in regard to local lesions.

One of the speakers at Brighton, to whom allusion was just made (Dr. Alfred Carpenter), is an honorary member of our Society, and a distinguished sanitarian. I am hopeful that we shall have the pleasure of hearing a paper from him during the session. If so, it will probably be *apropos* to this subject of universal interest.

With the progress of time the Society has naturally had to deplore the occasional passing away of esteemed and useful members. Their places, it is true, have been filled (numerically more than filled) by worthy successors. But yet there is room; we are ready and anxious to receive all honourable practitioners who desire to become associated with us in carrying out and extending the good work. To a number of these, however, the time for entry is short. Mr. Rogers at our last meeting particularly called attention to the fact that

candidates not being in possession of recognized diplomas should lose no time in sending in their papers, as the doors will of necessity be closed to such on and after November 1st next ensuing. I now follow up the announcement by asking you to kindly circulate amongst your friends information as to the urgency of this matter. Nominations should be forwarded at once to the Secretaries.

In the consideration of whatever may be brought under the notice of the Society, I know, Gentlemen, that I may with confidence rely upon your generous support. Following immediately the presidency of a brilliant and exceptionally successful year, I am conscious of the disadvantages under which I labour, but with your sustaining and kindly influence, I may, nevertheless, be enabled to follow the admirable example of my predecessor, to an extent sufficient to maintain the dignity of the Society.

At the suggestion of the PRESIDENT, a vote of thanks was passed to Mr. Sewill and the other contributors of the evening.

The PRESIDENT then announced that the next meeting of the Society would take place on March 6th.

The Meeting was then adjourned.

The following nominations of Candidates for election  
are now under the consideration of the Council :—

Alfred Sternfeld, M.D. Munich, Munich, Bavaria.

Edmund Augustine Bevers, M.R.C.S. Eng., 46, Broad  
Street, Oxford.

Walter Harris Coffin, F.C.S., 94, Cornwall Gardens,  
South Kensington.

Alfred John Baker, 2, Walcot Buildings, Bath.







Woodbury, Jr.

EDWIN SAUNDERS, F.R.C.S., Eng.

The following nominations are now under the consideration of the Council :—

Albert Edward Anderson, West Borough, Maidstone.

Harry Rose, L.D.S. Eng., 61, Albany Street, Regent's Park.

Alfred Bult Verrier, L.D.S.I., Park House, Weymouth.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*March 6th, 1882.*

S. LEE RYMER, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed,

The PRESIDENT announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz., Messrs.

ALFRED STERNFELD, M.D., of Munich, Bavaria.

EDMUND AUGUSTINE BEVERS, M.R.C.S.Eng., 46, Broad Street, Oxford.

WALTER HARRIS COFFIN, F.C.S., 94, Cornwall Gardens, South Kensington.

The following candidates were then balloted for and elected members of the Society, viz., Messrs.

WILLIAM BATES, L.D.S.I., Macclesfield.

CHARLES BROWNE-MASON, L.D.S.Eng., Southernhaye, Exeter; and

THOMAS MANSELL, L.D.S.Ed., Hanley; as non-resident members; and

CHARLES D. DAVIS, M.R.C.S. and L.D.S.Eng., Oxford Road, Kilburn; and

CORNELIUS ROBBINS, L.D.S.Eng., Oxford Road, Kilburn, as resident members.

MR. ALFRED COLEMAN showed a model taken from the mouth of an out-patient at St. Bartholomew's Hospital, who was the subject of inherited syphilis, as was shown by the notched central incisors. But the remarkable feature of the case was the position of the second or third left molar—it was difficult to say which tooth it was—the crown of which protruded towards the centre of the palate. The patient stated that another tooth had been similarly misdirected, and had been removed in consequence.

He also showed a third left molar which he had extracted with some difficulty, the fangs being curved. On looking at it to ascertain the cause of the unusual resistance, he found that the two fangs which are usually external were in this case *internal*; what is usually the palatine fang being external.

The next case was one which he had been asked to bring before the Society by his friend Mr. Lyons. In 1869 a female patient had two of her upper front teeth, a lateral and a central incisor, pivoted. The result of the operation was perfectly satisfactory, and remained so until a few weeks ago; subsequently periostitis set in, followed by alveolar abscess, and the teeth had to be extracted. Mr. Lyons then found that a large portion of the root of each had been absorbed, the pivot extending far beyond the apical foramen. Evidently this process had been going on for a considerable time, and it was remarkable that the protrusion of a foreign body into the alveolus should have been allowed to take place to such an extent before setting up any signs of irritation.

The next case was one which had occurred in his own practice at St. Bartholomew's Hospital. Having occasion to remove two temporary second molars from the mouth of a little girl, aged  $4\frac{1}{2}$  years, nitrous oxide was administered by the anæsthetist to the hospital. Just as he had extracted the first tooth the gag slipped, and as he was opening the child's mouth and attempting to grasp the second tooth, the anæsthetist called out that the patient was not breathing. They at once resorted to artificial respiration, and she soon took a deep breath, but he thought that the case afforded a

serious warning against the danger of giving an anæsthetic and operating single-handed. He felt that, had he been operating in that case without assistance, he should almost certainly have lost his patient. At that critical moment he was too much occupied in getting the mouth open and removing the second tooth to notice the sudden stoppage of respiration, the all-important moments would have been lost, and doubtless we should have had to record an addition to the happily very few deaths from nitrous oxide.

The last case he had to mention was one which Mr. Read, of Holles Street, had asked him to bring forward. A gentleman, now 25 years of age, had his right upper central knocked out by a hocky stick when he was a boy at school. The tooth was out of the mouth for about three hours, but was then replaced, soon became quite firm and remained useful until lately, when signs of irritation showed themselves, and Mr. Read extracted it. It was then found that absorption of the root had taken place to a very considerable extent. In this case, as in most that had come under his (Mr. Coleman's) notice, it would be seen that there was a ring of unaffected dentine surrounding the pulp cavity, and so distinct from the rest as almost to suggest the idea that it was of a different structure. Its existence might be accounted for in one of two ways, viz., either that this portion had been preserved by its proximity to a living pulp, or that the pulp cavity had contained septic material, and that this had influenced its surroundings and prevented absorption. This latter view he deemed the most probable, as doubtless the pulp had been long dead.

MR. HENRY MOON said that at the last meeting he had, in the discussion originated by Mr. Sewill, related a case in which the removal of dental irritation produced a remarkable effect on an epileptic patient. As his remarks upon this case had been misapprehended, and as they involved facts of importance, he would, with the consent of the President, restate them. The patient, a girl about 20 years old, was brought to Dr. Fagge at Guy's Hospital. It was stated that

from the age of 14 she had suffered from epileptic fits, that these had become more frequent of late, and that the speechless and apparently semi-imbecile condition in which she appeared at the hospital had come on a day or so previously. No treatment appeared to have been at any time attempted. Dr. Fagge prescribed bromide of potassium, but thinking that the aggravated symptoms might possibly be due to dental irritation, at once sent her to him (Mr. Moon). The girl was led into his room with her mouth open and an utterly blank expression of face. On examining her mouth he found that some teeth demanded extraction and others required stopping, but that the most likely cause of acute nerve disturbance was the eruption of an upper wisdom tooth. He therefore freely lanced the gum over this tooth, and the effect was immediate and most striking. The vacant expression left the girl's face, she got up and rinsed her mouth, and was at once restored to her normal condition. Dr. Fagge's medical treatment was continued. The carious teeth were treated and plugged at the Dental Hospital of London. She remained under observation for some months, and during that time was quite free from any recurrence of the attacks. Mr. Moon added, that from observation of this and other cases he was of opinion that in cases of abnormal condition of the nervous system, it was most desirable to get rid of all sources of dental irritation.

MR. COLEMAN remarked that although some appeared to be sceptical as to the efficiency of dental irritation to produce convulsions in adults, he saw no reason to doubt that, in certain conditions of the nervous system, this cause might produce the same effect in adults as it most certainly did in children. He had known of cases in which children had suffered from a succession of fits lasting for 24, 36, and even 48 hours, and in which lancing the gums had given immediate and permanent relief.

MR. MARCUS DAVIS exhibited three contrivances which he had found very useful in his own practice. The first was a rubber-dam weight with a cross-bar which stretched and

pressed down the rubber. It was very useful in operations on the buccal wall of a lower molar, as it kept the lip out of the way. The second was a fork rubber-dam appliance with an improved fastening for the silk, so as to obviate the old plan of twisting the silk round the shaft and the loss of time during the operation of undoing the same.

The last was a small wedge made of two pieces of watch-spring which could be separated by a screw placed between them. It was very useful for obtaining room for interstitial stoppings in incisor teeth, being more manageable and less liable to slip up than the wooden wedges frequently used.

MR. MORTON SMALE showed a model, taken from a young man aged 18, showing an abnormally large lower bicuspid—indeed it might almost be called an odontome. He also explained the action of an automatic saliva ejector which he had had fitted up in his operating room. It was in most respects similar to that described some months ago by Mr. Chas. Tomes.

The PRESIDENT then called upon Mr. Walter Coffin to read his paper on “The use of Gutta-Percha for taking Impressions in Regulation Cases.”

## *On Gutta-Percha Impressions in Regulating.*

BY WALTER H. COFFIN, F.C.S.,

F.L.S., F.R.M.S., M. Phys. S., etc.

THE statement that gutta-percha is the best impression material for regulating cases has occasioned surprise, though supported both by theoretical considerations and experience. At the Medical Congress in London last year were models from my father's collection, and a number of regulating plates, showing a method of treating dental irregularities, thought to be simpler, more systematic and certain than the means commonly employed ; the distinctive points of the scheme being :—gutta-percha impressions ; structurally complete or self-contained plates of rubber and pianoforte wire, thin, well fitting, but easily removable ; and recourse to either a permissive expanding construction, or general expansion direct. In a short paper read to the Dental Section on "A Generalised Treatment of Irregularities," I ventured the opinion that gutta-percha impressions were almost essential to realize the advantages of the system advocated. Subsequently a considerable private correspondence,

while gratifying as assuring me of an interest in the subject, has encouraged me to think that a few details I failed to describe of steps which differ from the ordinary procedure, might be acceptable.

The employment of gutta-percha in its present form, for impressions, so far as I am aware, dates back some 25 years to my father's acquaintance with the late Mr. Thomas Hancock (the great pioneer in the gutta-percha industry), who kindly undertook to assist in the determination of the best preparation for the purpose.

My father (having used nothing else since then for regulating cases, and consuming an incredible quantity) might be thought to be unduly prejudiced in its favour ; but as for some years I took on an average several regulating impressions daily, and embraced the opportunity of comparative trials with different materials (including many special preparations), I can state that fortunately, besides its intrinsic advantages, gutta-percha is also the simplest and easiest thing to use, permitting of either the greatest expedition, or most leisurely manipulation.

The ordinary opinion to the contrary may be due to inferior samples ; or improper methods of use, which are copied from one text-book to another. Directions are given to melt it in a pot, and take it out in a spoon ; to soften it before a fire or over

a flame ; to boil a lump of it in water till soft, press in a cup and heat the surface in a flame, etc. ; any of which processes must inevitably ruin the best gutta-percha as to its fitness for impressions. The use of soap, vaseline, French chalk, etc., as recommended, is superfluous ; and the elaborate precautions assumed to be necessary against real or imaginary properties of the material, only defeat the object in view. With the right quality, and a suitable cup, nothing more than a little hot and cold water, and a due regard to the peculiarities of the substance, is required to procure, in two minutes, a good impression.

As to the shape of the cup or tray, it is only essential that its floor, or convex outer surface, should so articulate with at least three points of the *opposing* teeth, that the patient may bite steadily upon it when in position. This is easily arranged with one of sheet metal that can be slightly adapted by bending. In exceptional cases the wedge-shaped end of a small wood stick may be held in position to equalize the bite at one of three places. Otherwise the fit of the cup need not be very exact, but better rather large than too small. It should, however, be everywhere perforated with rather large holes. Preferably, cups are made of pure sheet tin about  $\frac{1}{20}$ th of an inch thick, with cast handles soldered on. Special ones are unnecessary if two or three are made (for the

upper jaw) with abnormally high roofs, split along the centre from the palatal edge for an inch or so. One-half of the palate overlapping the other permits the cup to be bent for wide and narrow mouths, or for flat and high roofs equally well. With several of these and corresponding lower ones, made of various lengths (backwards), almost any case can be immediately fitted ; and they are useful in general artificial work for other materials.

To take an impression, the cup having been fitted (particularly as to the bite), a basin of cold water being provided, another is lined with a cloth and filled up with water just boiling ( $212^{\circ}$  F.). Into this gutta-percha in tolerably thin sheets being placed, immediately softens ; and lifted out on any kind of chopstick (I prefer a smooth glass rod) and just dipped in cold water for a second, may be manipulated with wet fingers and at once placed in the cup. It sets or hardens so slowly that this may be done with the utmost deliberation. Becoming thus somewhat chilled, the filled cup is put into the hot water again for half a minute, and the patient told that when placed in his mouth he is to very slowly and steadily close the jaws upon it (not biting repeatedly, in different ways,) and that though it may feel warm at first it will not burn. Taken from the hot water, the filled cup is dipped in the cold for about three seconds and conveyed to the mouth.

This superficial chill, which might skin over other materials, does not perceptibly harden the surface of gutta-percha, but prevents sticking or a feeling of burning. Its temperature, however, may be much higher than other materials without feeling so hot. While being bitten into, and slowly, the force may be augmented, if necessary, by the fingers ; the chief object being to press it equally, and then hold it steadily. While in the mouth it does not sensibly harden or set in the sense of becoming stiff (which would require from ten minutes to half-an-hour, and then be irremovable), but the properties of gutta-percha are such, that while resisting sudden deformation by a kind of elasticity, it yields to a small force, and is finally persuaded to adopt a shape in which it is held for a little time ; especially with a slight reduction of temperature. About a minute and a half is enough for this in the mouth ; but a little longer makes no difference, and its removal may be leisurely commenced. Being released from the bite, the lip and cheek are manipulated to facilitate the entrance of air, and with a firm grasp of the cup it is quickly removed.

The peculiarities of the material must still be respected, for almost as soft as when inserted, its own weight may spoil the impression if allowed to remain in the air. It should be immediately conveyed entirely under the surface of cool water (in

which, however, it does not at once harden, as both time and temperature are elements in the solidification of these curious colloid bodies), the object being to nearly balance its weight. Being carefully supported in the water, without contact with anything else, by resting the cup on something (as a rod or stick bridging the basin, or a block at the bottom) it may be left till convenient to cast. In parting a model from gutta-percha, care is required to thoroughly heat it through by sufficiently long immersion in hot, but not boiling water. Dry heat must be strictly avoided with gutta-percha, nor should it be boiled in water, as prolonged exposure to high temperatures is rapidly injurious.

As to the material itself, the foregoing remarks refer to a preparation consisting of about equal parts of fresh pure gutta-percha, and a fine light insoluble mineral powder ; these proportions having been found by Mr. Hancock and my father the best to minimise shrinkage and adhesiveness, and give plasticity with prompter setting. Mr. Hancock's early patents referring to dental purposes mention white lead, clay, chalk, magnesia, zinc-oxide, and other substances ; and the *Gutta-Percha Company*, which was founded by him, at first used several of these, but soon abandoned all but oxide of zinc as the best.

The pink preparation as made for many years by

the *Gutta-Percha Company*, and now well known in the English market, when fresh, fortunately leaves nothing better to be desired, if only *not* treated according to "directions" sent out by the depôts. The manufacturers maintain a commercial reticence as to its preparation, but a careful analysis shows it to consist of 56·8 per cent. of very finely ground and pure oxide of zinc, and vermillion.

Its working properties, however, depend on the quality of the gutta-percha itself, which varies immensely in the wholesale market. An American preparation, found to contain 67·9 per cent. of far heavier and denser zinc oxide and a little orange sulphide of antimony, is quite useless for impressions, partly owing probably to inferior and deteriorated raw gum. It is a matter of congratulation that the energies of manufacturers were enlisted while gutta-percha was still seeking employment, as they now consider it a special providence for telegraph cables; and regarding with horror any desecration of its mission, effectually discourage suggestions for more humble uses.

A satisfactory sample is distinguished by the strong smell characteristic of fresh gum; its great pliability, toughness, and absence of brittleness when cold; and its freedom from stickiness when wet at temperatures below 212° F. After using only a few times it becomes more

plastic with heat, gives sharper casts, and is better adapted for partial denture work ; but with age and much use it rapidly deteriorates, being brittle and harder when cold, and softer and more sticky when hot.

A model in superfine plaster from gutta-percha has a smoother surface than from other materials, with undercuts not as pronounced as with plaster impressions, but just enough indicated for the purpose ; or if there are no undercuts, or they have to be cut away, a delicate springy plate, of elastic hard rubber (vulcanized upon the model direct), on account of the slight shrinkage of gutta-percha, will generally fit the mouth very closely and tightly. It is more satisfactory and easier to remove pronounced undercuts or ramifications from the plate, than have to accentuate them on the model, and scrape the necks of teeth capriciously ; and then, perhaps, have to tie in the plate with ligatures.

When it is attempted to move a tooth in the old way, with pegs, compresses, etc.,—which depend for their action upon the plate being partly sprung away from its proper position, into which it is driven either by the bite or its own elasticity,—it is often extremely difficult or impossible to retain the plate without tying it in ; but if little spring levers of piano wire or other means are employed, to act *after* the plate is absolutely

in position, much less of the force reacting is resolved in a direction tending to displace it. In such cases where short and round teeth are most unfavourably shaped for retaining it, a plate so constructed from a gutta-percha impression, may often be made quite firm. A necessarily thick, stiff, or bulky plate may require relief with fine saw cuts in places to enable it to be inserted.

A model can be very fairly copied, in all its undercuts, with gutta-percha, by treating the surface thoroughly with French chalk (steatite powder), and pressing the model and gutta-percha together in cold water for about one minute. Such a copy is useful for reference and comparison. Models waxed, stearined, or paraffined, cannot be so copied, and for this and other reasons I prefer in preserving models, simply to treat them well with steatite powder, as they are then easier washed and cleaned. An old model, however dirty, if not stained, can be well cleansed by first dusting lightly, giving a forcible douche with cold water, and then dabbing its surface all over firmly with a small lump of old and sticky gutta-percha softened in warm water, which takes from the pores of the plaster without injuring it, dust and dirt otherwise irremovable. This ignoble service is, alas, the only use I know of for old and used up gutta-percha.

## DISCUSSION.

MR. FELIX WEISS said that about the year 1856 he was led to pay a good deal of attention to the use of gutta-percha for taking impressions, and he found as the result of his enquiries and experiments, that the amount of the natural gutta-percha of commerce which was suitable for this purpose was very small, probably not more than 10 per cent. of the whole amount imported. He found that the readiest way of testing the material was to cut the blocks through, and then to cut out a small portion from the interior, and bite it. If it can be bitten out into a thin sheet it is good, but if it breaks up under the teeth it is useless.

The PRESIDENT said he had at one time tried gutta-percha, but had abandoned it in favour of plaster, in which he had great faith. He now, however, felt much inclined to try gutta-percha again, following Mr. Coffin's directions for manipulating it. It was certainly much more agreeable to the patient; plaster was very nasty stuff to put into the mouth, and most patients had a great objection to it.

DR. WALKER said that he had been indebted to Mr. Coffin for some practical instruction in the details of his method of treatment, and he had been delighted to see the power of his arrangements in the five or six cases in which he had since had an opportunity of trying it. He found that he could expand the dental arch in three weeks without setting up irritation. But he was rather at a loss to understand why Mr. Coffin laid so much stress on the use of gutta-percha for these regulating cases, instead of plaster; and if it was so useful in regulation cases, why not in taking impressions for dentures? He should also like to ask Mr. Coffin whether he had tried using the forceps as a means of hastening the rotation of canines. He had found that a slight twist with

the forceps once a week saved much time, and had no bad effect.

MR. COLEMAN thanked Mr. Coffin for his very useful, practical hints. He had himself obtained admirable impressions with gutta-percha, but had discarded it because it appeared so liable to warp, or alter its shape in some way; but he now found that he had not gone the right way to work. He had also long employed plates very similar to those of Mr. Coffin, but much less perfect; still, he had found them very useful. He had found that he could expand a V shaped arch and bring in the front teeth at the same time. But the great advantage was, that it did not necessitate frequent visits on the part of the patient. If wedging was resorted to, it was necessary to keep the patient constantly under observation, and sometimes they would fail to attend regularly, and then things went wrong. Lastly, the expansion plate was much more comfortable to wear.

MR. STOCKEN said he had also been in the habit of using a similar plan of expanding the teeth, but he had used thick wire of dental alloy, instead of pianoforte wire, and he expanded it once a week. In this way he had found it quite easy to expand the arch without the aid of wedges. He readily admitted, however, that Mr. Coffin's was a better arrangement.

MR. WALTER COFFIN, in reply, said that Mr. Weiss was quite correct in stating that by far the greater part of the commercial rubber imported was not reliable for this purpose; in fact what was called gutta-percha varied immensely in its physical properties, some of it being almost as hard and inelastic as shellac. In reply to Mr. Coleman he would admit that gutta-percha did not take quite as accurate an impression as plaster would; still it would be found the best material for use in these cases, partly perhaps for the reason that he had mentioned in his paper, viz.: that gutta-percha shrinks slightly in setting whilst plaster expands, thus giving a somewhat tighter fit to the plate. As to the tendency to

alter its shape after removal from the mouth, Mr. Coleman would find that if he would keep the tray in the mouth for two minutes, and then place it at once under water, no change would take place.

On the motion of the President a vote of thanks was passed to Messrs. Coleman, Moon, and other contributors of Casual Communications, and to Mr. Coffin for his paper.

The Meeting was then adjourned.



The following nominations have been received by the Council :—

HENRY T. K. KEMPTON, L.D.S. Eng., Cavendish-place, W.

J. GEORGE WILLIAMS, L.D.S. Eng., Cavendish-place, W.

THOS. READ, L.D.S. Eng., Holles-street, Cavendish-square, W.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*April 3rd, 1882.*

SAMUEL LEE RYMER, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed,

MR. CORNELIUS ROBBINS signed the Obligation Book and was formally admitted to Membership by the President.

The PRESIDENT announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz., Messrs.

HARRY ROSE, L.D.S. Eng., of Albany Street, Regent's Park; and

ALBERT EDWARD ANDERSON, of West Borough, Maidstone, Kent.

The following candidates were then balloted for and elected members of the Society, viz., Messrs.

FREDERICK NEWLAND PEDLEY, M.R.C.S. and L.D.S. Eng., of Camden Road, N.W.

E. LLOYD WILLIAMS, L.D.S. Eng., of James Street, Buckingham Gate, S.W.; and

GEORGE HARRIS DOWSETT, of Gloucester Street, Portman Square, W., as resident members; and Messrs.

THOMAS EDWARD KING, L.D.S. Eng., of Coney Street, York; and

GEORGE CUNNINGHAM, D.M.D. HARVARD, of York Row, Wisbeach, as non-resident members.

MR. G. A. HOCKLEY showed for Mr. E. R. Hockley, of Gravesend, a right upper second molar joined to the wisdom tooth. The patient, a farmer's wife, of middle age, had suffered for some time from neuralgic pains which appeared to be referable to the second molar. This was accordingly extracted and, although there was no unusual amount of resistance, the third molar came with it. The roots of the second molar were found to be extensively exostosed.

MR. ACKERY presented to the Museum the specimens of unilateral syphilitic deformity of the central incisors which he had shown at a previous meeting, and which had since been carefully mounted by Mr. Weiss; he believed such cases to be extremely rare. He showed also a second and third molar with progressively bifurcated fangs, the third molar being most so.

MR. COLEMAN said he had seen more than one case in which, like those described by Mr. Ackery, one central incisor showed the distinct syphilitic type whilst its comrade preserved the normal form, but he pleaded guilty to not having been so industrious as that gentleman in obtaining models of them.

The cast he wished to exhibit bore on this very subject; it showed two supernumerary teeth of the syphilitic type, whilst the proper teeth coming within the dental arch were well formed. Of course it might be said that the latter were the supernumerary ones. Although the lower teeth, excepting the central incisors, did not exhibit the typical appearance, that was fully borne out in the physiognomy and other conditions of the patient. The anterior teeth had been removed and the posterior were in process of being pushed out to their proper positions. It was fortunate for the individual that he had this excess in his dentition.

Another case, of which he also exhibited a cast, was that of a patient, likewise of the Dental Hospital, who presented himself with two supernumerary teeth of the multi-cuspid class found generally in the central incisor region, and which were not, but which in their front view looked so like syphi-

litic teeth that a large number of gentlemen undergoing the process of having their fitness to practise tested, pronounced them as such. The left central incisor was situated in front of the lateral and its fang inclined to that of the right cuspidate. The right central could be just felt where the root of the right supernumerary terminated and just where the upper lip joined the maxilla. The treatment pursued was that suggested by Mr. Charles Tomes, viz., the transplantation of the left central into the alveolus of the left supernumerary. Although, as our Museum testified, the roots of these multicuspid supernumeraries are generally well developed, he (Mr. Coleman) thought it prudent to delay the operation until he had in hand a patient with a sound lateral to part with, in case the lateral incisors should prove too large for the alveolus of the supernumerary. This, however, was not necessary, their adjustment was perfect, but an unforeseen difficulty arose, viz., that the anterior wall of the alveolus was absent, the two alveoli being common at this part, and there was nothing to retain the tooth in position. To overcome this, Mr. Hern, the house-surgeon, constructed a plate which, without pressure, restrained the tooth *in situ*. Mr. Coleman then introduced the patient to the meeting, and the tooth which had been transplanted was seen to be fairly in position, though a little prominent, and moderately firm; the operation had been done about seven weeks. He had suggested that the right supernumerary should be left until the proper tooth had become erupted.

MR. GURNELL HAMMOND said he had been requested to say something about the operation he had lately performed at the Zoological Gardens, but he really had very little to add to the account which, by some means or other, had found its way into the daily papers. They had considerable difficulty in getting the animal under the influence of the chloroform owing to the fact that he preferred sucking the cloth instead of inhaling quietly; it took about 40 minutes to get him anæsthetised. The tooth was the first right upper molar, and Mr. Hammond had great difficulty in forcing up the instru-

ment and extracting the tooth on account of the great thickness and hardness of the alveolus. Having extracted the tooth, he tried to tap the antrum through the alveolus, but could not succeed in doing so. He therefore perforated the anterior wall with a trochar and some two or three fluid drachms of matter escaped. The patient had been at once relieved by the operation, and had got on very well since. At the suggestion of the President, Mr. Hammond presented the tooth to the Museum.

The Secretary then read the following communication from Mr. Edwin Cox, L.D.S., England, of Auckland, New Zealand, and late of Preston, England.

*"Notes of a case of Cancer commencing obscurely in the Right Superior Maxilla."*

"In the beginning of 1878, Mr. M. D., aged 44, a strong and muscular man, called upon me stating that for several years he had had a discharge in connection with his right upper double teeth. He thought lightly of the circumstance, but as he could not account for it, and as it not only continued but was slightly increasing, he thought it well to see what could be done to remove it. On examination I perceived a thin, yellowish, septic fluid very slowly issuing between the first and second right upper molars, and slightly spreading upon the labial surface of the latter. The discharge was slight, but appeared to increase with pressure on the gum between and above the teeth. The first molar contained an old amalgam filling, otherwise it was apparently healthy. The second was slightly decayed but free from morbid sensibility, and bore mastication without pain or discomfort. Was the discharge an evidence of chronic periostitis? But at no time had Mr. D. suffered acutely in connection with these teeth; and the formation of pus from periostitis could hardly be imagined without acute suffering at one time or another. I did not at first suspect the insidious presence of cancer, for

there was an absence of the offensive odour characteristic of that disease, nor was there anything in Mr. D's. complexion or physical condition to suggest its presence on a cancerous diathesis. The right upper wisdom tooth had not erupted, and I thought that possibly it had burrowed into an abnormal position and infringed upon the fangs of the second molar; or that the discharge was a sign or result of inflammation in the antrum. Yet there was no pain about the cheek bone, and Mr. D. affirmed that he had never had pain either in the teeth or on the cheek bone. As I could not explain this persistent discharge, I thought it best merely to supply Mr. D. with an astringent and antiseptic lotion and to request him to call in a fortnight. On Mr. D's. next visit I found that the lotion had produced only slight and temporary benefit; the discharge continued practically the same. As it appeared to be closely connected with the second molar, I persuaded Mr. D. with a little difficulty to consent to its extraction. For several months after the operation the discharge was greatly reduced; now and then Mr. D. believed that it had entirely ceased. But our hopes were disappointed. Probably it had never wholly ceased; at all events, in spite of a variety of applications, it increased and became extremely unpleasant. By and bye a small perforation of the alveolar ridge was perceptible immediately behind the first molar. In a week or two it was large enough to admit the mouth of a syringe, and allow the antrum to be washed out; this I directed Mr. D. to do once or twice a day. The case gave me anxiety; evidently there was some grave and obscure complication; perhaps chronic disease of the antrum, probably necrosis of the maxilla, or of the antrum, or of both. I advised Mr. D. that the case was peculiar, that I could not explain it, and I urged the advisability of obtaining the best possible medical advice. Reluctantly, for he had no perception of danger, or of the gravity of the symptoms, Mr. D. consented, and placed himself under the care of Dr. Brown, of Preston, who for some time did not regard the case as cancerous, but as extremely obscure, and ordered the use of lotions, tonic medicines, and regimen. Subsequently, as the symp-

toms were getting more pronounced, yet apparently not cancerous, Dr. Brown advised Mr. D., as I had myself urged, to go up to London and see Mr. Heath. This was accordingly done; Mr. Heath made an exploratory operation along the right maxilla, finding, as he reported to Dr. Brown, "very extensive necrosis," but not suggesting the presence of cancer, and not until the later stages of the progress of the case was this an assured fact. Subsequently, Mr. D. consulted Mr. Bickersteth of Liverpool, who ordered the immediate removal of the first molar and the fang of the right lateral incisor. I removed them, with the aid of nitrous oxide gas, and with that operation my personal connection with the case ended.

"I had hoped to complete this report by the valuable addition of Dr. Brown's notes, which he kindly promised but has been unable to send me. In their absence I can only add a few concluding facts. The sequel of the case was a history of intense suffering,—neuralgic pains extending along the right side and crown of the head, and so intense as to produce at times temporary insanity, and relieved only by daily injections of morphia,—of the rapid spread of the disease until it involved the palate and the throat, and finally of the rupture of a blood-vessel in the latter region by which the sufferings of the patient and the anxiety of his attendants were suddenly and mercifully terminated. Mr. D. died on December 29th, 1878.

"I am most impressed with the following points in this case, viz., the insidious origin of the disease, the duration of the discharge before attaining any unpleasant amount, and the obscurity of the disease owing to the prolonged absence of the cancerous odour."

MR. HENRI WEISS said a case of epithelioma of the lower jaw, beginning insidiously in a manner very like that described by Mr. Cox, had occurred in his own practice. He sent the patient to Mr. Heath, who tried to remove the disease by operation, but it had recurred, and the patient was now in the last stage of the disease.

The PRESIDENT then called upon Mr. Gaddes to read his paper on "The Limitations of Dental Surgery."

*The Limitation of Dental Surgery.*

THE nature of this paper is, perhaps, not that ordinarily termed scientific; yet as it deals with certain facts of experience, embodies questions as to the proper lines of treatment adopted, and solicits the opinions of members of this Society as to the course pursued being within the recognized limits of Dental Surgery, I trust the subjects of my communication, written under great pressure, will not be without some interest.

A girl, aged 16 years, was sent by a general practitioner to the National Dental Hospital for advice respecting an abscess-like growth, which bled frequently and was in connection with the buccal aspect of the first upper right molar. My colleague, Mr. Henri Weiss, saw the patient, and determined, under the influence of nitrous oxide, to remove the tooth, and what he readily diagnosed as a tumour, together with the outer plate of the alveolus. The effect of the anæsthetic too quickly passed off, and only the tooth and bulk of the growth could be removed. The next day the patient again appeared, and Mr. Weiss drew my attention to the case. There had been some pain and hæmorrhage from the wound, the girl was anæmic, and large granulations filled up the space recently

occupied by the molar tooth. A microscopic examination of the growth, which was about the size of a bean, showed it to be a round-celled sarcoma, and very vascular. It was attached to the periosteum of the two buccal roots of the tooth, but was quite free from the palatine root.

Before interfering further surgically, we thought it better to improve the patient's low and anaemic condition by the administration of a tonic and haematinic: a note to that effect was sent to the general practitioner. After three days the patient's appearance was slightly improved, but the tumour was considerably increased in size, and came in contact with the lower tooth on occlusion. Nitrous oxide and æther were administered, and I removed the whole of the remaining outer alveolar plate with the hyperplasia. On the following and subsequent days the granulating surfaces were cauterised with nitric acid, and also, at other times, with caustic potash, so as to check their excessive growth by, if possible, retarding the proliferation of the embryonic elements, and favouring the elaboration of a more mature fibrous tissue. Though the application of those agents destroyed an amount of tissue, yet the tumour recurred with considerable rapidity, and with occasional haemorrhage, and by the end of a fortnight it was clear that enough had not been removed. Desiring to be as conservative as

possible, and to retain the second bicuspid in front, and the second molar behind, gas and æther were again given, and the whole of the socket and gum tissue around, to nearly the periosteum of the floor of the antrum, were gouged out. This had the desired effect. Some rapidly growing granulations were touched with caustic potash ; perostitis of the second molar was relieved by opium fomentations, and the parts were kept clean by a solution of permanganate of potash. I saw the patient quite recently, some four months after the operation ; the wound was quite healed, and there was no indication of so much of the bone having been removed.

This case clearly shows the importance of the oft-repeated necessity of a complete removal of all tissue invaded with the embryonic cell elements of the most recurrent form of the sarcomatous tumours. But while the significance of that injunction is fully recognized, we should not lose sight of possible error in the opposite direction, and, by a too heroic treatment, make undue sacrifices even to irreparable deformity.

Apart from the surgical aspect of the case, I should be grateful if this question were taken up in the discussion : “Was the last-mentioned operation within the limits of Dental Surgery as recognized in the United Kingdom ?” My own view of the circumstances was, that, assuming the

propriety of a Dental Surgeon removing at one operation a tooth and the entire socket of that tooth, there could scarcely be established any valid question of professional locus if at one time the tooth were extracted, and at another the diseased socket of that tooth removed. The border line between General Surgery and Dental Surgery is at present ill-defined. Before such a limitation can be fixed, or correctly understood, we must first determine the scope of the specialty as may be practised by the Licentiate in Dental Surgery.

I have for several years regarded Dental Surgery as embracing the treatment of diseases of the teeth, and also of the contiguous parts, the teeth being the cause. Our text-books do not afford any guide, for while they, in varying degree, deal with affections of parts allied more or less to the teeth, there is rarely set forth that a certain disease comes within the scope of the general surgeon or practitioner, rather than belongs to the sphere of Dental Surgery. An example of that is to be found in diseases of the antrum, which may arise independently of, and be in no way connected with the teeth, yet they are all treated with about equal attention. The same may be said of tumours of the gums, and of ulceration of the gums, &c.

While we recognize the desirability of maintaining a close and friendly relationship with General Surgery, I would respectfully suggest that this

Society might, with much utility, intimate the limits of Dental Surgery. Such an expression would be of great value as a rule of guidance to the majority of members, and, perhaps, protect them, and by them the Dental Profession, against liability to overstep the boundary of the specialty.

This is a subject which, in its broad and general aspect, has not, that I am aware of, been discussed by this Society; and the toleration afforded in submitting these observations to the meeting I gratefully acknowledge.

## DISCUSSION.

**MR. S. J. HUTCHINSON :** Before we enter upon the discussion to which Mr. Gaddes invites us, I should like to ask the President whether it is within the scope of this Society to determine political and ethical questions of this character. I have always understood that the meetings of this Society were to be devoted to the discussion of scientific questions only.

**The PRESIDENT :** I scarcely think the question raised by Mr. Gaddes can be said to be a "political" one, nor do I see any reason why this Society should not discuss it, if it is so minded; indeed, I know of no other body which is better qualified to do so.

**MR. F. HENRI WEISS** said the question which had been raised that evening by Mr. Gaddes with regard to surgical treatment, was brought under the notice of the Society by Mr. Stocken when he read a paper on "The Value of Constitutional Remedies in the Treatment of Diseases of the Teeth," and deplored the too frequent neglect of these remedies by dental practitioners. The right of dental surgeons to prescribe was called in question on that occasion, and their late President gave it as his opinion that "so long as there was any prospect of saving a tooth, dental practitioners were justified in using any means, constitutional or local, to this end." In this instance, however, it was not a matter of saving the tooth with which the disease was connected, and its simple extraction would have done no good to the patient. He would, however, at once admit that they were to some extent led on. In the first instance it was an apparently simple case; there was an apparently innocent-looking tumour connected with a tooth, and it was only after the first operation that they found they had to deal with a more serious matter. He was

not prepared to say that had they at first known the exact nature of the case they would have acted as they had done, but, having once taken the case in hand, they felt inclined to persevere with it. No doubt had things gone wrong with the patient, they might have found themselves in a position of some difficulty. The object of the paper was, however, not so much to decide whether they had done right or wrong in treating this particular case, as to ascertain whether any definition could be arrived at as to what should be generally considered to be the limits of Dental Surgery.

MR. S. J. HUTCHINSON. Before stating my own opinion, I would remind the Society that I have always been a loyal supporter of the L.D.S. as a full qualification in Dental Surgery; and although I am myself a M.R.C.S., I have never put this forward as entitling me to any special privileges or exemptions. I am, however, strongly of opinion that the dental licence entitles its possessor only to practise Dental Surgery, and if he goes on to practise Oral Surgery, he should be fully qualified as a surgeon. I think the admission of Mr. Weiss, that had anything gone wrong with this patient, those who took charge of her might have found themselves in difficulties, is very much to the point. I think they should have referred the case to a general hospital. My own practice is always so to refer oral cases, whether they be hospital or private patients. They may need medical treatment, bandaging, or visiting at their own homes, and these are duties which, practising as a dental surgeon, I am not prepared to undertake.

MR. STOCKEN thought that Mr. Rogers' dictum, quoted by Mr. Weiss, did not go quite far enough. The duties of the Dental Surgeon did not necessarily end when a tooth was extracted; for instance he was not unfrequently called upon to arrest haemorrhage. He thought it might be said that so long as the disease to be treated arose from a tooth, the Dental Surgeon was justified in treating it either constitutionally or locally, medically or surgically. It might be that some of those now in the profession were scarcely competent

for such extended duties, but this should not be given as a reason for limiting the province of the Dental Surgeon: on the contrary, it only showed the necessity of educating him up to his proper level. In Germany, the duties of the Dentist were not limited to the treatment of diseases of the teeth, but included the whole province of Oral Surgery; and English Dentists ought to extend their practice in the same direction. He might mention a case which had occurred in his own practice, showing the necessity for a tolerably wide range of knowledge on the part of the Dentist. A medical practitioner came to him complaining of a carious molar; he was also suffering from facial paralysis. Mr. Stocken asked him whether he had any idea that the diseased tooth might be the cause of the paralysis. He said no, it had not occurred to him. Mr. Stocken took down Mr. Salter's book, and showed him just such a case recorded therein. The patient then requested that the tooth might be extracted at once; this was done, and the paralysis disappeared within a week.

MR. R. H. WOODHOUSE remarked that a little heroic treatment occasionally might not do much harm in the case of hospital patients, but private patients must be taken into consideration as well, and he thought that in these cases, at all events, the dental practitioner would do well to confine his attention to the care of the dental tissues. Besides the risk and anxiety attached to the treatment of such cases as that described by Mr. Gaddes, any considerable extension of the practice of the Dental Surgeon in this direction would certainly involve him in difficulties with the surgical profession at large.

MR. LAWRENCE REED said he thought that the time of the Society was being wasted on such a discussion as this. It might be just as well that students should have the limits of their future profession mapped out for them, but qualified practitioners were able to form their own ideas in such matters, and he had never heard that the Society assumed to direct members as to how they should conduct their practice. He

could not see what practical good could result from the discussion.

MR. GADDES, in reply, said he was inclined to agree to a great extent with Mr. Hutchinson. Oral surgery included dental surgery, but where was the limit. He thought that a good definition of the limits of dental surgery was much wanted, and that the Society would be doing the profession a service by laying down a rule which would be a guide to those who wished to practise dental surgery only. As to the remarks about heroic treatment of hospital patients, he thought that all patients, both in private and in hospital practice, should be treated alike, and he should consider any such difference as had been suggested to be very reprehensible.

On the motion of the PRESIDENT a vote of thanks was passed to Mr. Gaddes for his paper, and to the contributors of casual communications and of specimens.

At the conclusion of the meeting, Mr. A. B. Verrier, of Weymouth, showed his Continuous Gum Furnace in action, and demonstrated the process of firing a denture.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*May 1st, 1882.*

SAMUEL LEE RYMER, Esq., PRESIDENT, IN THE CHAIR.

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The Minutes of the previous Meeting having been read and confirmed, the PRESIDENT rose and said :

GENTLEMEN, before we proceed to the business of the evening, I am sorry to have to remind you that since our last meeting the world has lost an eminent worker in the field of science. Charles Robert Darwin has passed away from us, and although he has left in his works a precious legacy, highly valued throughout the world, still we cannot help regretting that his well-directed and fruitful labours have come to an end. It appeared to the Council that we might appropriately express in our corporate capacity as a scientific Society the sorrow which I am sure we all feel as individuals. I have, therefore, been deputed to propose that the following vote of condolence be passed by the Society, and that a copy be forwarded to the family of the deceased :—

“The Odontological Society of Great Britain deeply regrets the loss sustained in the death of Charles Robert Darwin, whose eminent scientific labours and contributions deserve the deep gratitude of all who are interested in the progress of knowledge. That the sympathy of the Society be conveyed to the widow and family of Mr. Darwin in their heavy bereavement.”

This was unanimously agreed to.

The following gentlemen signed the Obligation Book, and were formally admitted to membership by the President, viz., Messrs.

GEORGE HARRIS DOWSETT and  
FREDERICK NEWLAND PEDLEY.

The PRESIDENT announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz., Messrs.

J. GEORGE WILLIAMS, L.D.S., Eng., of Cavendish Place,  
W. ;  
THOMAS READ, L.D.S., Eng., of Holles Street, Cavendish  
Square ; and  
ALFRED JOHN BAKER, 2, Walcot Buildings, Bath.

The following candidates were then balloted for and elected members of the Society, viz., Messrs.

ALFRED STERNFELD, M.D., of Munich;  
EDMUND AUGUSTUS BEVERS, M.R.C.S., of Broad Street,  
Oxford ; and  
WALTER HARRIS COFFIN, F.C.S., of Cornwall Gardens,  
South Kensington.

MR. HENRY SEWILL then handed round a card on which the following specimens were mounted :—

- (1.) Right lower molar with a third root: an unusually good specimen, from a boy.
- (2.) An upper molar, the space between the roots of which was filled up by an irregular mass of dental tissue; it might, in fact, almost be called an odontome.
- (3.) A lower molar, which looked as if a longitudinal section had been made through one of the roots, the crown being intact. The tooth presented exactly the same appearance when first extracted. Mr. Sewill at once explored the alveolus for the missing fragment and extracted it. The patient had not met with any accident, and no cause could be assigned for the fracture.
- (4.) A lower first molar of a boy, aged 16, having a

large cavity in the posterior surface into which part of the crown of the second molar had fallen. Mr. Sewill extracted the first molar, and the second came out with it. He at once replaced it, and no harm resulted ; there was no inflammation, and the tooth soon became firm. This was the third case of the kind which had occurred in his practice. In the first of these, the crown of a wisdom tooth had become impacted in a carious cavity on the distal surface of a second molar, and on extracting the latter, the third molar came out with it. The next case was that of a lady, who consulted him on account of suppuration in the socket of a lower molar. On extracting this tooth the next one came with it, the two being united by firm fibrous adhesions. With regard to such cases as the first and third, he should be more on his guard in future, and should take more time over the operation, so that if he saw the second tooth rise in its socket, he could press it back at once.

In the next place, he wished to mention again a matter which he had brought under the notice of the Society some years ago. In 1874, he stated at one of the meetings that he had used absolute alcohol for the purpose of drying cavities, with very satisfactory results. Since then he had found that ordinary rectified spirit would answer very well for this purpose, and it had the advantage of not blistering the lips or tongue if they were accidentally touched by it. He had been led to mention this subject again, by reading a paper in the last (April) number of the "Journal of the British Dental Association," in which the writer spoke of drying cavities by means of pieces of tissue paper. He (Mr. Sewill) thought that alcohol would be found simpler and more efficient. It could be easily pumped into the root canals, and could be trusted to abstract in evaporating the moisture, not only from the surface, but from the substance of softened dentine and shreds of pulp, leaving them in a condition in which, if sealed from contact with water, they would be incapable of decomposition.

Another question on which he was desirous of ascertaining the views of members generally, was whether or not it was wise to extract the teeth of pregnant women. Such patients were constantly coming for advice, and to be relieved of pain; but when extraction was proposed, it being evident that the tooth was past saving, one was met with the answer that the patient's doctor did not consider that it would be safe for her to undergo such an operation in her present condition; so the operation was postponed, the patient continued to suffer, and became worn out with pain. His own opinion was that this was a sort of prejudice very much on a par with the idea that it was dangerous or wrong to extract a tooth during the acute stage of alviolar abscess. His practice was, in the case of a patient in the early stages of pregnancy, to give gas and extract the tooth; even if the patient was weak and nervous, he believed that the slight shock of the operation was less likely to do harm than the exhaustion produced by long-continued pain. In more advanced cases, one must be guided a good deal by circumstances, but in *most* of these even he believed that extraction did no harm. He had given gas and removed teeth in a patient seven months advanced in pregnancy, without any bad effects following.

The PRESIDENT remarked that the Society was much indebted to Mr. Sewill for his very practical observations. It was not always easy to get members to come forward with written papers, and those that were offered were not always on subjects in which the meeting took any great interest; but practical points like those mentioned by Mr. Sewill came home to every one, and he had no doubt that many of those present would have something to say about them. He would suggest that the subjects be discussed *seriatim*.

MR. F. H. WEISS said that Mr. Sewill's third specimen reminded him of a patient who came to him complaining of tenderness and neuralgic pain in the second right upper bicuspid. The tooth appeared at first sight to be sound; there was no caries, but closer inspection revealed the fact

that it was split for about two-thirds of its length. The patient was quite unaware how the accident had happened.

MR. F. CANTON said a lady once came to him complaining of pain in an upper bicuspid; he examined it carefully, but could not find much the matter with it. Eighteen months later the patient returned, saying that the tooth continued very sensitive; the line of fracture was then quite evident, and he extracted the tooth. But the patient could not tell in the least how it had been done.

MR. STOCKEN mentioned the case of a gentleman who had applied to him twice on account of similar fractures, first of a first and then of a second lower molar; the latter was split right down to the very end of the fangs.

MR. STEELE said that a few years ago an old lady, about seventy years of age, applied to him on account of pain in a molar, which had been stopped with gold by Mr. Cartwright forty years before. The tooth and stopping appeared quite sound, but it was so painful that he extracted it, and then found that it had been broken in half; the line of division could not be distinguished whilst the tooth was *in situ*. The pulp was alive.

MR. CHARTERS WHITE said that with regard to the removal of two teeth instead of one, he had to confess that this accident had occurred four times in his practice, and curiously the same teeth had been extracted in each case. The tooth which he intended to remove was in each instance the first left lower molar, and that which had been unintentionally removed was the second bicuspid. He had always replaced this tooth at once and secured it by a silk ligature, and the cases had all done well.

MR. COLEMAN said he had *once* removed a bicuspid when extracting a first molar, and he thought that probably the same thing might have occurred oftener but that he now took the precaution of placing his thumb on the crown of the tooth he did not wish to disturb and thus kept it down. In the case above referred to he found that the bony septum

between the two alveoli was absent, and he thought that possibly this might have had something to do with the occurrence of the accident in other cases also.

MR. HUTCHINSON said he was reminded of a humorous remark made by Dr. Taft at one of the meetings of Section XII of the Congress. Speaking of something of this sort, he said, "It is done occasionally, but of course it has never happened to any of us. It's the other boys who do it." However, as everybody seemed to be in a confessional mood, he did not mind saying that this accident had happened to himself on one occasion. A patient came to him with a large cavity in the back of the first molar; part of the crown of the second molar had become locked in this, and on extracting the first the second came with it. With regard to the cases mentioned by Messrs. Sewill and White, did they think that the replanted teeth were alive?

MR. CHARTERS WHITE answered that it was difficult to say what the condition of the pulp might be; all he could say was that the tooth had not altered in colour, and as regards appearance and sensation could not be distinguished from the other teeth.

MR. F. J. BENNETT thought it was a mistake to suppose that teeth always changed colour when dead. He believed that there was no special sign by which it could be determined whether a tooth was living or dead. The application of heat was the most reliable test.

MR. COLEMAN remarked that even the heat test was fallible, since the periosteum of dead teeth was often in an irritable state, and a dead tooth would sometimes appear to be sensitive to heat when it was really only the periosteum which was affected by it.

MR. SEWILL said that of course he could not be certain that the vessels had reunited at the apical foramen, indeed he thought it more probable that they had not; but there could be no doubt that the periosteal vessels had reunited, and

these appeared to be quite sufficient to maintain a tooth in a state of vitality.

The PRESIDENT then invited observations with reference to the use of alcohol for the drying of cavities.

MR. A. COLEMAN said he had used it for this purpose, and had found it very useful. There was no doubt that the mixture of alcohol and water evaporated more readily than water by itself; he thought also that the spirit rendered the saliva less viscid and more easily removable.

MR. STOCKEN said he also had found it a very useful application. His plan was to pour ordinary rectified spirit on carbonate of potash in a stoppered bottle. The carbonate, having a great affinity for water, took it from the spirit, and although *absolute* alcohol could not be obtained in this way, it would be found quite strong enough. The small amount of alkali which was taken up by the spirit was, he thought, rather beneficial than otherwise.

The subject of the extraction of teeth in pregnancy was then proceeded with.

MR. F. CANTON said he had frequently been asked this question, and never hesitated to answer it in the affirmative. He always preferred to give gas in such cases, and took care to give it *thoroughly*. He had never seen any harm result from the extraction of teeth under these conditions.

MR. GEORGE WALLIS said that on one occasion he was consulted about a patient who was very near her time. She was suffering great pain, so he at once gave gas and extracted the tooth. The child was born within twelve hours after the operation, and the mother had a much easier time than she would have had with an aching tooth to add to her other pains.

MR. COLEMAN thought that in a matter of this kind experience carried more weight than theoretical considerations, and his experience was that an operation under gas

was perfectly harmless. He never hesitated to operate when an operation was necessary. Long-continued pain might of itself produce a miscarriage, and the shock of an operation done without gas might possibly have the same effect; he thought, therefore, it was always best to give the gas.

MR. F. H. WEISS said he always had a fear in such cases lest the mental impression upon the mother should produce deformity in the child. Was there no danger of this?

MR. STOCKEN said he had once consulted an eminent accoucheur on this very point, and his reply was that there could be no danger of deformity to the child after the period of quickening.

MR. E. LLOYD WILLIAMS said he had once had some trouble from this cause. He performed an extraction under gas for a lady, and she was prematurely confined a day or two afterwards. Her friends thought it was due to the gas, and were disposed to blame him in consequence.

MR. GADDES asked whether the patient was thoroughly under the influence of the gas at the time the operation was performed, or whether she was semi-conscious?

MR. WILLIAMS replied that the operation was performed quite painlessly.

MR. SEWILL observed that with regard to congenital deformities, it was well known that they were due to arrested or perverted growth which had its origin at a very early stage of intra-uterine life; they were besides so rare, comparatively speaking, that they might really be left out of consideration. It was no doubt true that some women were liable to miscarry on very slight causes, and even with no apparent cause at all, and in a patient of this sort it might be wise to avoid operative interference, unless the case was evidently of an urgent nature. Though, on the other hand, because a miscarriage followed an extraction, it might not really be due to it.

MR. W. T. HENRY showed a model of the mouth of a child, eight years of age, in which the upper incisor teeth projected forwards in a most remarkable and unsightly manner, the deformity being due to the fact that the lower incisors impinged upon the necks of the upper on the lingual aspect. Taking into consideration the refractory character of his patient, the only treatment he could think of was to cut off the upper part of the crowns of the lower incisors, extract the upper temporary canines, and then draw in the upper incisors.

MR. STEELE said that having met with several cases of this sort in the course of his practice, he had been led to think over the subject, and at last had devised a plan of treatment which had given very satisfactory results. It was undoubtedly a most unsightly deformity, and one which, unless promptly treated, tended to increase until it was necessary to extract the lower incisors. His plan was to gag the front of the mouth, placing something—a gold or vulcanite plate—for the lower incisors to strike against, so arranged that when the jaws were closed, the molars were clear of each other. The tendency of teeth being to advance if they had no antagonists, it would be found at the end of, say, three months, that the space between the molars would have disappeared, and that they met even when the plate was in position, and that when the plate was removed, the lower incisors no longer struck upon the upper. The upper incisors would, of course, also have to be drawn back.

MR. PAYNE said he had seen a somewhat similar plan of treating this deformity, by capping the front teeth, mentioned in the "Cosmos."

MR. S. J. HUTCHINSON said he could not help thinking that the treatment proposed by Mr. Henry was unnecessarily severe. He thought that if he would persuade the father of the child to wait until the latter was twelve years old, and the permanent molars were in position, he would find that the deformity would by that time have become much less

marked. He might then remove the first bicuspids, and draw back the incisors. It was necessary, however, to insist upon the plate being worn for a considerable time after the teeth had apparently resumed their proper position, for such cases were exceedingly liable to relapse.

MR. HENRY said he was very much obliged to Mr. Steele for the idea he had given him, and should be much disposed to try the plan, though he feared he should not be able to get his very unruly patient to wear the plate for any length of time. As for Mr. Hutchinson's suggestion that nothing should be done until the child was twelve years of age, that was out of the question. The case had been getting rapidly worse during the last eighteen months, and he had no expectation of any improvement except as the result of treatment.

MR. COLEMAN said he had treated cases of this sort on the plan which Mr. Steele had described, and had invariably met with success.

THE PRESIDENT said he had been able to watch the progress of Mr. Steele's cases, and could state that the improvement, even within a short time, was most marked.

MR. STOCKEN called the attention of the Society to the bad effects which he believed he had noticed as resulting from the use of "Floriline." He had noticed the same results in several cases, and could even recognise those who made use of this preparation from seeing its effects in the mouth. The gums round the teeth acquired a strawberry-like appearance, the necks of the teeth were often coated with mucus, and the teeth themselves were hyper-sensitive and eroded. He believed it was an injurious preparation, causing disintegration of the teeth.

THE PRESIDENT then called upon Mr. Steele to read his paper on "The connection between Mechanical Injury and Caries of the Teeth."

MR. PRESIDENT AND GENTLEMEN,

THE few remarks I wish to offer may seem rather unimportant, but as you, Sir, have invited fragmentary as well as more complete notices and experiences, I venture to submit a "memorandum" I have made as to one of the occasional factors immediately and directly engaged in the process leading to dental caries: I allude to mechanical injury in relation to caries of the teeth.

Whenever the subject of the cause of decay in the teeth is discussed, the consideration is often prefaced by an admission that no certain definition has yet been arrived at.\*

The explanation which appears best to satisfy the mind of the enquiring patient is that it is "constitutional."

Scientific investigation has certainly revealed something much more precise than is implied in this very general statement, but it is only from a comparatively speaking recent period that the true structure of the teeth has been determined,

\* In glancing at the subject on the occasion of his inaugural address as President of the Odontological Society in 1878, Mr. Coleman remarked upon caries, "that with a disease occurring on the very surface of an organ, fairly exposed to view, and which may be watched from its very commencement to its close, we are yet amongst ourselves wholly undecided as to its true nature and cause."

and as a consequence, up to that period the nature of the disease was hidden in obscurity.

With the knowledge at present available, the pathological conditions of the tissues are capable of being clearly described by the scientific teacher, and understood by the intelligent student.

In dental caries we find the departure from a normal state represented by a decomposition of the tooth, or a portion thereof, the cause of which is more or less remote, but sometimes apparently directly traceable.

Dr. Scriven, in a paper read now some years ago before the Odontological Society of Pennsylvania, expresses the opinion that "Caries is a disorganization of dental structure, originating in all cases from mechanical, chemical, or physiological causes ;" by careful examination, he adds, "the three causes conjointly may be observed as active agents in the destruction of carious teeth." This comprehensive summary is doubtless enough to admit of a large measure of minute explanation, nevertheless, it seems exceedingly pertinent and expressive.

As a matter of fact, descriptive *minutiae* have been abundantly supplied by learned demonstrators, chemical and vital theories have in this way been instructively set forth, and are, no doubt, fully appreciated.

I would desire now to refer to *one* of the most

frequent and absolutely direct causes of mischief, viz., that of "mechanical injury." This appears scarcely to have received the attention its importance requires.\*

The friable substance known as the enamel would in all probability effectually protect the dentine so long as the enamel structure remained intact. Perfect enamel is considered by some authorities to be in itself not liable to caries at all, and that it can only suffer from injuries of a mechanical nature.

Such injuries occur continually from so early an age that it has become almost an impossibility to find teeth with enamel otherwise than damaged in some way, although not necessarily sufficiently so to render it imperfect as a protective armour.

According to Mr. Hulme, the principal exciting cause of caries is an acid condition of the fluids of

\* In 1861 a paper of extraordinary interest was read before this Society by Mr. Bridgman, of Norwich, in which the origin of caries was very ably dealt with. The author, after a series of careful experiments and much observation, saw cause to attribute the mischief generally to electrical agency, but he did not fail to give place to essential contributory causes, and he remarks, "that decay may be produced by mechanical injury is unfortunately too well known to admit of doubt." Again, he says, "the mechanical disintegration of the enamel crystals, and a slight breaking up of the dentine at the neck of the tooth, is the first stage in the proceedings, and the absorption of moisture by the injured membrane is the next stage. The development of acid then follows, and is rapidly succeeded in regular order by the usual symptoms" No doubt many others who have given attention to the subject have observed that fissured and starred enamel is produced by carelessness and accident, but these facts have not been brought forward in a manner to allow of any materially successful action being taken for prevention.

the mouth producing decomposition of the earthy salts which enter so largely into the composition of the dentine, and elaborate scientific experiments appear to confirm this plain statement.

Enamel in a sufficiently imperfect or disintegrated state, whether from congenital deformity, or from concussion, or as the result of mutual pressure, the latter being often observable upon the enamel at the approximal surfaces of the teeth, and in the neighbourhood of the terminal portions, enamel in this state allows the deadly fluid to come in contact with the underlying dentine, and thus the vital energy of the nutrient fluid contained in the tubuli of the dentine is attacked by a foe too potent to withstand. It fails to flow, and in receding leaves the stained canaliculi and their surroundings to rapid disintegration.

If there be anything worthy of consideration in this cursory review, as a practical result it would point towards something more than has hitherto been done towards checking carelessness in early life, so that teeth should not be recklessly abused.

Both sexes in childhood are alike naturally lamentably ignorant of the trouble they are laying in store for themselves by subjecting structures which appear to them so hard and strong, to all sorts of cruel roughness. Education as to the evils of maltreatment should be persistently enforced

both at home and at school, so that at least one of the inroads of dental caries would be placed under a material amount of self-control, with a reasonable hope of diminishing its ravages.

## DISCUSSION.

MR. CHARTERS WHITE said he thought that the division of the causes of caries into chemical, mechanical, and physiological was a very good one. The chemical causes were the most active, and had most to answer for. There seemed to be little doubt that the phenomena of caries were due, in great part at least, to the effect of acid, which might arise from an unhealthy state of the secretions, as in gout, or more commonly from the decomposition of food. Deficient cleanliness was therefore a pre-disposing cause; if a gold plate was not frequently removed and cleaned, you could trace its outline mapped out on the necks of the teeth. And he thought he had noticed a beneficial effect in the mouths of those who regularly used an alkaline dentifrice. Mechanical causes came next, in his opinion. There was no doubt that people who used their teeth for the purpose of cracking nuts, or who, as he had heard of in one instance, would crunch up a wine glass, generally paid the penalty of their foolhardiness. The extensive caries sometimes seen in jaws that were over crowded with teeth was due to this cause—the teeth crushed one another. He remembered a young man who had an exceptionally fine set of teeth, but crowded; he had a severe attack of rheumatic fever, and directly afterwards interstitial caries appeared all over the mouth; whether this was the result of the medicine he had taken, or whether the vitality of the teeth had been lowered by the illness he had gone through, and they had thus been rendered more susceptible than before to the injurious effects of mutual pressure, he could scarcely say.

Physiological causes must not be altogether overlooked; they served to explain the symmetrical form which caries would sometimes take, as where the lateral incisors on opposite sides of the mouth became diseased in corresponding places.

MR. HENRY SEWILL said there was one statement in Mr. Steele's paper to which he felt inclined to take exception. He did not think that we were in such a state of gross ignorance with regard to the pathology of caries as that gentleman had asserted. In fact he thought that the pathology of caries was now fairly well understood. The main feature of the disease was the solution of the earthy constituent of the dentine by acid, generated as the result of the decomposition of food, &c., in the mouth. This was pre-disposed to by defective tooth structure. All the essential features of caries could be produced by artificial solution out of the mouth. The recent investigations of Messrs. Underwood and Milles did not really alter the essential features of this explanation. It seemed that bacteria in some way favoured the progress of the disease, and in what way they acted we did not yet know; but the essence of caries was the chemical solution of the earthy portion of the dentine by acid, and as to this there was no mystery at all.

It being now ten o'clock, the President called upon Mr. Steele to reply, which he did very briefly.

The PRESIDENT then thanked Messrs. Sewill, Henry, and Steele, in the name of the Society, for their interesting communications, and remarked upon the amount of discussion to which they had given rise. He then announced that at the next meeting (June 5th) Mr. Hunt, of Yeovil, would read a paper on "Celluloid."

The meeting was then adjourned.



# Odontological Society of Great Britain.

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## ORDINARY MONTHLY MEETING.

*June 5th, 1882.*

SAMUEL LEE RYMER, Esq., L.D.S., PRESIDENT, IN THE  
CHAIR.

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The minutes of the previous meeting having been read and confirmed,

The Secretary read the following letter from Mr. George Darwin, thanking the Society for the vote of condolence passed at the last meeting :—

“DOWN, BECKENHAM,  
*May 11th, 1882.*

“DEAR SIR,

“I write on behalf of my mother and the rest of our family to beg that you will convey to the Odontological Society our thanks for their resolution of sympathy with us in our great loss.

“I beg you will also assure them that we highly appreciate the universal recognition of the greatness of my father’s character and scientific work.

“I remain, dear Sir,

“Yours very faithfully,

“GEORGE DARWIN.”

MESSRS. W. H. COFFIN and E. LLOYD WILLIAMS signed the Obligation Book, and were formally admitted to membership by the President.

The President announced that the following gentleman had been duly nominated and would be balloted for at a subsequent meeting :—

M. PAUL HYPOLITE VICTOR POINSOT, Member of the Société Syndicate Odontologique de France, Paris.

The following candidates were then balloted for and elected members of the Society, viz.: Messrs.

HARRY ROSE, L.D.S. Eng., of 61, Albany Street, Regent's Park ; and

ALBERT EDWARD ANDERSON, of West Borough, Maidstone.

MR. S. J. HUTCHINSON announced that, as Curator, he had received from Mr. Wilson, of Edinburgh, a duplicate model of a case of transposed canines and bicuspids on both sides of the mouth ; and from Mr. T. Russell Whatford, of Newcastle, two curious specimens of salivary calculus.

MR. CHAS. TOMES said Mr. Hutchinson had asked him to announce some other donations to the Museum, which had just been sent to him, and which Mr. Hutchinson had not yet seen. These were the skulls of a male leopard, of a sloth bear (*Ursus Labiatus*), with the teeth much worn down, and of a tiger—all sent by Mr. O'Meara, of Simla, a gentleman from whom they had received many previous donations. The tiger's jaw gave evidence of the existence at one time of an alveolar abscess connected with one of the canines. The animal had been shot through the mouth, the bullet had broken the root of the canine, and acute inflammation had resulted ; recovery had, however, taken place, though considerable roughening of the bone had been left.

He showed also the skull of a dog which had been sent by Mr. E. M. Tod, of Brighton, for the Museum. The animal was 12 years old, and so feeble that it was proposed to kill it. Although its other teeth were much worn, some small incisor teeth would be seen in the front of the mouth not worn at all, in fact only just erupted.

Mr. Wallis had sent a lower wisdom tooth, at the extremity of both the roots of which there was a deep groove, amounting to more than a semi-circle, which had evidently contained

the inferior dental nerve. In this case all the four wisdom teeth were buried in the gum, and this one was evidently causing irritation, being surmounted by a luxuriant growth of polypi. These having been tried, the tooth was extracted by means of the elevator, but not without the use of a considerable amount of force; the crown was found to be carious. Complete paralysis of the parts supplied by the inferior dental nerve followed the operation, and extensive exfoliation of bone had also occurred—the entire socket having been exfoliated. Mr. Sewill had exhibited a wisdom tooth earlier in the session in which there was a complete canal through one of the roots which had contained this nerve. He hoped that this patient might be as fortunate as Mr. Sewill's as regards the recovery of sensation.

MR. STEVENSON then demonstrated his method of making steel springs. He said he considered the use of springs generally objectionable, but cases did occasionally occur in which their use was unavoidable. In one such case the patient, who was suffering from brain disease, was constantly breaking his gold springs, and at last it occurred to Mr. Stevenson to try steel ones. The experiment succeeded so well that he had used them in other cases with great satisfaction to the patients. The advantages were that they were lighter and less easily put out of order than gold ones.

MR. HUNT said that since listening to Mr. Coffin's paper at the International Medical Congress, he had been induced to try steel springs for regulating, and had found them answer splendidly. A scientific neighbour of his had made himself spiral springs of iridium wire, which was exceedingly well adapted for the purpose for which Mr. Stevenson advocated steel.

The President then called upon Mr. Hunt to read his paper on "Celluloid."

*On Celluloid.*

By W. A. HUNT, L.R.C.P. Lond., M.R.C.S. Eng., etc., Yeovil.

IN complying with a request to address you tonight, I avoid the arena where the exciting battle is still being carried on between the cohesive and the non-cohesive gentlemen ; I shun the pleasant pastures where we turn our attention to making the “ crooked straight and the rough places plain,” nor do I seek to soar in heights where comparative dental anatomists and histologists stretch their wings, but descend to the so-called “ lowly ” subject of mechanical dentistry. This subject, both in our own and in other Dental Societies, does not, in my judgment, receive as much attention as it deserves. But without fear of my statement being challenged, I say, that notwithstanding all the increased knowledge in our possession, our increased skill in combating disease, and the increasing number of well trained practitioners, yet mortal disease of the teeth seems on the increase, and the forceps are constantly obliged to perform the last kind offices in the removal of the useless organ.

As practitioners, we are expected by our patients to do our best to restore these lost organs, to give them back, in so far as is possible, the power of

properly masticating their food, and so of removing the cause of oftentimes a long train of discomforts, dyspepsia, and other diseases, which are dependent on imperfect mastication, known by hearsay only, I hope, to those present, but probably more correctly estimated by those only who have had experience of them in their own persons.

Such being the case, I say it is a false pride that views what is termed mechanical dentistry as too lowly for notice. The study of an art that confers such admitted benefits on our fellow creatures is, I contend, *not* beneath the notice of any educated man, and, *à fortiori*, not beneath the notice of a Society whose very *raison d'être* is to advance and perfect the knowledge of Dental Surgery.

In mechanical dentistry, perhaps, during the last few years no subject has excited more interest, and, indeed, more disappointment, than that of celluloid. I say it has excited more interest : we all have long desired a base, strong, life-like, durable, in which artificial teeth could be mounted and arranged so that each individual tooth could be placed in the position best suited for its own special functions and requirements. We all know how impossible it is with section blocks to bring about this result, and if we turn our attention to continuous gum work, we soon find that after employing the utmost labour and skill, much val-

able time, and using costly material, we have a plate which, even if fulfilling all that we can desire in fit and appearance, nevertheless makes a noise when striking upon antagonising teeth in the mouth, which is distressing to most patients, and is heavy, liable to fall, and become broken or chipped, then very difficult to repair, and of course very costly ; in fact, necessitating a fee practically putting such a plate beyond the reach of many of our patients.

We, I think, must all admit that celluloid, even imperfectly manipulated, in appearance is infinitely superior and more life-like than any other base but continuous gum work, and hearing from enthusiasts, both in this country and across the Atlantic, such remarkable statements as to durability, ease, and certainty of manipulation, etc., celluloid, I say, naturally excited much interest.

On actual experiments with all the then best means at our disposal, we found many unlooked-for difficulties in manipulation : rapid change of colour, warping, and softening of this beautiful looking base after some wear in the mouth. Disappointment then followed ; operators no longer indulged in such enthusiastic praise, they cautiously said, "that no doubt the material was beautiful, and there was a possibility that it would be useful for temporary purposes." Some declared themselves not only disappointed, but disgusted,

and others, too indolent to undertake the trouble of experimenting for themselves, said : “ I told you so ; I never had any opinion of the ‘ stuff ’ from the first.”

Let us now consider the reason of these conflicting statements.

An excellent paper was read in 1879 by Dr. Eben Flagg, New York, entitled “ Why Celluloid does not succeed,” before the Connecticut Valley Dental Society. He said : “ If we go on working celluloid in the manner which we have been taught, it will prove a failure, because there has been no apparatus that will fulfil the conditions required for the production of a perfect plate.” These conditions, he said, were as follows :—

1st. No steam, oil, or other foreign substance, must be allowed to come in contact with the material whilst it is plastic, or it will discolour. Hold a piece of transparent celluloid in a jet of steam, and it soon becomes opaque and altered.

2nd. During the process of pressing, one portion of the blank must not be colder than another portion, or it will warp.

3rd. The material must have its form changed at a heat that is much higher than is now used, otherwise it will have a tendency to return to its original form, or in other words, to warp. This superior heat must be obtained in an apparatus that is air-tight ; for if the super-heated material

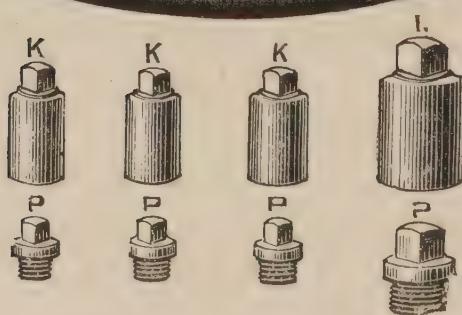
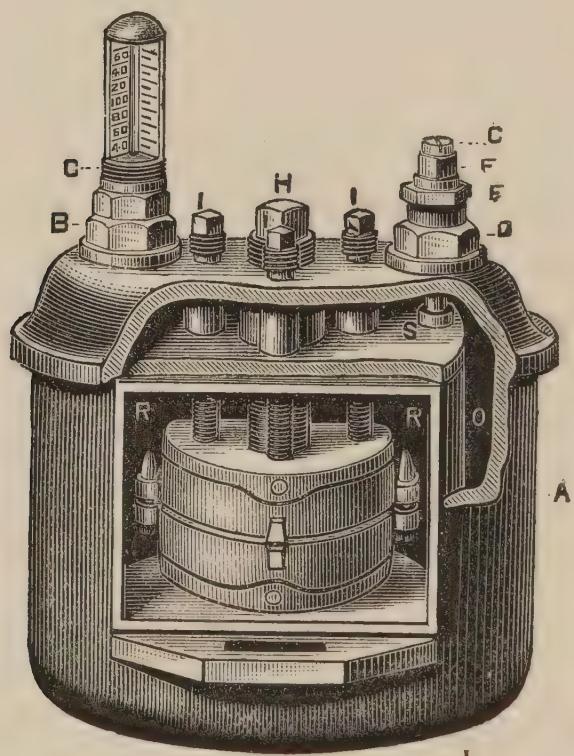
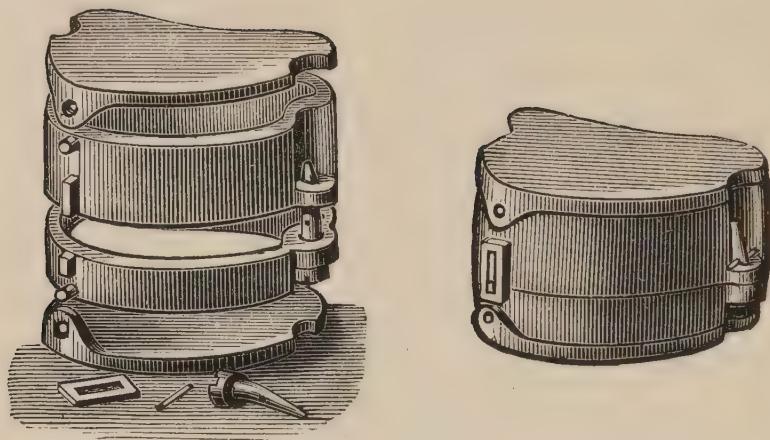
can obtain oxygen, either in the form of vapour or in a current of air, it will surely burn.

Dr. Flagg also said : “ Take a large blank, and fill it with plaster, thus making a model for it to rest upon. The blank, of course, will fit this model, and in six or twelve months’ time it will fit as well. The Celluloid Company have not boiled that blank in oil or glycerine, they have not subjected it to a current of super-heated steam, nor have they cooked it in an oven that would heat one part of it more than another. We may take the same blank, and put it in to soak in the promiscuous contents of our saliva pump, and there it may soak for six months at a temperature of 100° Fahr., with no change to either colour or form. We will now take a similar blank, and mould it on a plaster cast in a steam machine. The first effect we note is, that our steam-moulded plate will smell strongly of camphor, and cut under the instrument in somewhat the manner of hard cheese. In about three days the smell of camphor will have left the piece, and while we congratulate ourselves on that effect, there will be another effect upon which we cannot congratulate ourselves, and that is, that the steam-moulded piece of celluloid will not fit the cast at all ; so much for the effect of steam upon the fit. If we now take our steam-moulded piece of celluloid, and put it to soak in the contents of the saliva pump, we

shall find that in one week it will begin to discolour, and in a month will present an appearance as disagreeable as bow-spring rubber."



In this unsatisfactory manner does Dr. Flagg's paper end, but it is precisely here that I begin. I have to bring under your notice to-night a most skilfully designed machine which fulfills all the



conditions asked for by Dr. Flagg—conditions which far more extended experience since 1879 has shown to be absolutely needful for the successful manipulation of celluloid.

The inventor of this admirable machine, Dr. Campbell, of the United States, came to England during the late International Medical Congress, and gave a series of demonstrations of the facilities and advantages of working celluloid by its means.

You have thus a means of obtaining in a *dry* chamber an equal heat all around your flask, of any degree required, and which can be maintained equably any length of time ; you can through the glass door perceive all that goes on, and take out or put in your flask instantly whenever you wish, which is a great desideratum.

With regard to the high temperature obtained with this machine, and the risk of explosion in consequence, I need only refer to the careful experiments conducted by Mr. Gartrel, of Penzance, in an excellent book on celluloid, published by him in 1879. He there shows the great inaccuracy of thermometers, and gives cogent reasons why a pressure gauge is far superior to a thermometer. His pressure gauge shows the amount of steam pressure, as well as the inside temperature of his boiler, and automatically regulates the gas that heats the boiler. I have had one in use since 1879, and it has been of the greatest comfort and

satisfaction to me. In one case it worked admirably without even being looked at for 41 hours.

Now with this instrument he tested the effect of high temperature on a celluloid blank in a steam boiler. He found when a pressure of about 80 lbs. of steam =  $325^{\circ}$  Fahr., was reached, the index of the gauge went rapidly up, showing a sudden increase of pressure in the boiler, which turned out to be due to sudden decomposition of the celluloid, but which was not so instantaneous and violent as to be compared with gun-cotton, or those substances used as explosives, nor enough to explode or do any injury to a well made vulcaniser. All that remains after such an experiment is a little black dust.

Now the hot chamber in the New Mode machine keeps at a lower temperature than the surrounding boiler, unless it has been kept closed for some time, when the two temperatures become equal. I placed in a platina capsule 30 grains of celluloid, and having 90 lbs. of steam =  $331^{\circ}$  Fahr., in the boiler, I put on the glass shutter, and was thus able to watch the effect. In five minutes, beyond softening no other change had taken place. I then used 100 lbs. of steam =  $340^{\circ}$  Fahr., for five minutes : it began to swell a little. Then I used 105 lbs. =  $342^{\circ}$  Fahr., for five minutes more : it became much swollen, glassy bubbles formed and burst on the surface, and it was nearly fluid enough to flow by

its own weight : at the same time vapour rushed slowly out at the valve. I removed it from the chamber, and found it four times the size it was ; the colour was not altered much, but it was spongy, and had lost weight.

I returned it into the hot chamber, and raising the pressure to 110 lbs.= $345^{\circ}$ , it continued to swell, and at the end of four minutes suddenly decomposed, filling the chamber with brown vapour. On examining the platina capsule, nothing of the 30 grains of celluloid remained but black carbonaceous woolly particles, which weighed  $1\frac{1}{2}$  grains only. Now inside this chamber I had a thermometer, and when decomposition occurred it registered  $326^{\circ}$  Fahr. I have reason to think that the temperature was even higher than this, as the mercury was at the top of the tube, and could therefore not go higher.

This experiment will illustrate the fluidity obtainable in safety by the use of a high temperature, and Dr. Campbell has kindly consented to press a blank at high temperature in your presence. He has an entire upper set invested in a flask, prepared so skilfully that in five minutes he will close his flask, and in another ten minutes take it out in a condition almost ready for the mouth, and certainly fit for your inspection. Whilst this is going on, I may draw attention to this fact, viz.: that when tin models are used to mould celluloid

upon, and all surfaces that otherwise would be in contact with the plaster investment are protected as you have seen this evening with tinfoil, the surface of the finished plate is much harder, and more durable, and more beautiful, and I feel sure that those who will take the trouble to obtain *accurate* tin models from *accurate* plaster models of the mouth will be astonished and gratified at the wonderfully perfect and comfortable fit obtained to the living tissues of the mouth, a result unapproachable by the old methods.

Equally valuable is this machine in the treatment of vulcanite. Persons who manipulate india-rubber in the arts on a large scale, in order to reach good results have found by experience certain conditions absolutely essential for success—conditions, let me observe, absolutely impossible until now in any dental vulcaniser, and which are at once obtainable with this machine. This matter, besides being beyond the scope of my paper, would require an entire evening to discuss.

From considerable personal experience with this machine, I consider that a certain amount of skill and knowledge is required beyond the mere rule of thumb ability of the ordinary laboratory assistant, but I am convinced that by its intelligent use a whole catalogue of difficulties which have obscured the path hitherto will be dissipated, and whether we wish to cook a mutton chop or a

celluloid blank or a rubber plate in it, we shall have equal reason to be satisfied.

I have sought rather to lay down broad principles, than to give elaborate details. Men living in London enjoy much more rapid communication of ideas than their provincial brethren ; so I hope my endeavour to benefit the many, even at the cost of wearying the favoured few, may on this account be forgiven.

## DISCUSSION.

The PRESIDENT remarked that the Society had to thank Mr. Hunt for an eminently practical and interesting paper. The full attendance of members confirmed what Mr. Hunt had stated as to the interest taken in the subject by the profession, and he had no doubt that a great many of those present would be able to give an account of their own experience with this substance ; he anticipated, therefore, a good discussion.

MR. FELIX WEISS said that whilst he thanked Mr. Hunt for the pains he had evidently taken to make his paper instructive, he thought it would have been better if the author had devoted more attention to a description of the properties of the material and less to the *modus operandi*. The mode of working celluloid was, it appeared to him, sufficiently well known, but its exact properties were as yet but imperfectly understood.

Celluloid was first introduced and patented by Mr. John Mackintosh, on May 4th, 1860, and Mr. Weiss at the time experimented with it rather extensively. It had then three great faults, and he could not learn that these had yet been entirely overcome. There was, first, its tendency to shrinkage, then its tendency to double and flake off, and lastly, the difficulty of adding to it and repairing it. It was, no doubt, a valuable material in certain cases, where lightness was required, but it should never be used for small pieces or in thin pieces. Then there was its tendency to change colour : large pieces kept their colour best, but all discoloured more or less. It also wore away more easily than rubber ; it would become frayed even by the action of the tongue. On the whole he could not see what was to be gained by substituting celluloid for rubber. Rubber plates, as they all knew, would last for 20 or 25 years without change, but he had never seen one of celluloid that had been tested for half that time. Nor

was the apparatus which had been described by Mr. Hunt altogether novel. The first plan suggested for working celluloid was in a dry hot chamber; then steam was tried, then glycerine, and lastly the injecting plan, which was the least satisfactory of all. With regard to Dr. Campbell's apparatus, although steam was not admitted into the chamber, yet unless great care was taken to dry the plaster thoroughly, steam would be given off from it and the heat would not be "dry."

With regard to Mr. Hunt's remarks on steam gauges, he would say that gauges by themselves were quite as unreliable as thermometers; they were very apt to get out of order; he should advise every one to keep an eye on the thermometer also—checking the one by the other.

He did not wish to appear to decry Dr. Campbell's apparatus. He was inclined to think that it was an improvement on its predecessors; certainly the plate which Dr. Campbell had just turned out appeared denser than any he (Mr. Weiss) had yet met with; but he believed that the faults he had mentioned were inherent in the material, and that this plate would show them in the mouth, much as any other would.

MR. VANDERPANT (Kingston) said that four years ago he obtained a celluloid apparatus from the Dental Manufacturing Company, and had used it occasionally since, when he met with what appeared to be suitable cases, and with some success. Thus in September, 1878, he made a plain upper suction-plate, and he had an opportunity of examining it about two months ago. He found it little changed: it had not warped, it was somewhat less polished, but was practically quite perfect. About two years ago he made a partial denture carrying two centrals; this he had seen lately. One of the incisors appeared to have become a little prominent, but the piece was still in good condition. At the same time he felt bound to admit that his failures had been almost as numerous as his successes.

DR. WALKER said Dr. Campbell had supplied him with one

of his machines in August last, and it had been used by his assistant two or three times weekly. He should like to ask Mr. Weiss whether he based the opinions he had expressed on the results of work done with Dr. Campbell's or with some other apparatus? If the latter was the case, then he agreed with him that the result was failure. But if he would try Dr. Campbell's machine and follow strictly the inventor's instructions he would find that his results would be satisfactory. He had not been troubled with folding or exfoliation of the material since he had used this apparatus, but had constantly met with this before. A patient had worn a celluloid denture prepared in the glycerine process for twelve months; at death it was returned him; within a week the shape was quite changed: warpage and misfit, the consequence of exposure to the air. Dr. Walker had prepared many celluloid dentures for patients, and illustrated his lectures by showing the students the preparations in their various stages; he had also shown dentures used by the patient for weeks, and then exposed to the air, when little or no change was perceptible. With reference to Mr. Weiss's remarks about the pressure of moisture in the chamber, he would point out that any moisture that there might be in the plaster readily escaped through an opening provided for it. The operator watched this opening, and did not insert the celluloid until steam ceased to pass through the valve.

MR. VASEY asked how long it took to dry the plaster properly?

MR. HUNT replied about three-quarters of an hour, but absolute dryness was not necessary.

MR. MAGGS said that he had used celluloid occasionally during the last two or three years with fair success. He found, however, that in the mouths of smokers it became badly stained, and even in some non-smokers when the mouth was not in a healthy condition. One drawback was that when repaired it became lighter in colour, and he thought it did not hold the pins as well as rubber did. It was, however,

light and comfortable, and he had found it very useful in regulation cases.

MR. GEORGE S. WILLIAMS said that when celluloid was first introduced he hailed it gladly. He did not like vulcanite for several reasons, so gave it up and took to the new material. He first tried numerous experiments, with dry heat and with steam, and at different temperatures. At last he thought he had found out the right method, and then set to work to make a plate for himself. This looked well and fitted well, but for six weeks he neither ate nor drank anything but camphor. Then he made numerous sets for patients, and they were highly approved of. But after a time he found that whenever the celluloid came in contact with bone—as where it covered stumps, or rested against the necks of teeth—it flaked away. It did better in edentulous mouths, but even in these cases it became wasted by attrition; and in the end he was obliged to return to vulcanite. He had renewed thirty celluloid plates last year, substituting vulcanite, and should have been glad to have replaced others if he could have met with the patients. He found also that celluloid was very apt to warp if left out of the mouth. Thus he made two sets for a patient, to be worn alternately; one of these was left out of the mouth for a fortnight, and was then returned to him because it would not fit. He found it had contracted  $\frac{3}{16}$  inch.

MR. STEELE (Croydon) said his previous experience was like that of Mr. Williams, unfavourable; but since he had used Dr. Campbell's apparatus he had seen reason to change his opinion. All the cases he had made with that machine had turned out well: the density of the plate was greater, it had a better surface, and he found that they wore better. There was still a taste of camphor when the piece was new, but it was much less strong than in those prepared by the steam method.

DR. WALKER said he had found that it did not do to put celluloid over old roots. These must all be cleared away.

MR. WILLIAMS said that a good way of removing the taste of camphor was to soak the plate in a bath of dilute

sulphuric acid, but he was not sure whether it did not damage the plate.

MR. F. CANTON said he had used a "New Mode" machine for some months, and had had no failures; it was, however, too short a time to enable him to speak positively as to the properties of the material. The great objection was the difficulty of adding to or repairing it. It was best suited for entire sets.

MR. HENRI WEISS said he had found celluloid useful in combination with gold; in this way a gain of half an ounce in weight might be obtained in a full set, and he found that patients liked it better than gold and vulcanite.

MR. CHAS. TOMES said it appeared to him that all that had been stated was the result of general impressions, and founded on a very short experience. They had to deal with a compound of camphor and cellulose of uncertain composition, and they had been told nothing about the changes which took place in this material during the process of heating, whether there was any loss of camphor, any change in the specific gravity, what was the breaking strain before and after, etc. He should like to hear something definite as to these changes, and then with these data and statistics founded on (say) an experience of fifty pieces worn for a considerable time, he should consider that he had some grounds on which to form an opinion.

The PRESIDENT said he could confirm what Mr. Steele had said about the value of Dr. Campbell's machine; he should be sorry to be without it. He found it especially useful for regulation plates. He would now call on Mr. Hunt for his reply.

MR. HUNT said he did not consider that the faults which had been mentioned were inherent in celluloid; he thought that, owing to faulty manipulation, the material had not been fairly treated. It was true that dry heat had been tried before, but it had not been properly tried; as Dr. Flagg had pointed out, no apparatus had been brought forward which fulfilled all the conditions necessary. Dr. Campbell's did fulfil

them. Celluloid plates must not be kept dry out of the mouth; when not in use they should be kept in a tumbler of water. If not kept clean they would discolour; but the tendency to unfold, double, and flake was quite overcome by Dr. Campbell's method. It was not necessary to soak the plate in dilute sulphuric acid in order to remove the camphor; the taste was so slight as scarcely to be noticed by the patient. Prepared at the high temperature recommended by Dr. Campbell the material was not bent, but flows and solidifies in its new shape, and thus the liability to warp was almost entirely got rid of; a shrinkage of  $\frac{3}{16}$  inch could not occur with this mode of working.

Its greater comfort to the patient was due to the fact that it was a better conductor of heat than vulcanite, but a less rapid conductor than gold. Patients often complained that the roof of their mouth felt hot with a vulcanite plate, but did not do so with celluloid.

He had not troubled himself about chemical changes; he knew that the blank lost considerably in weight, but he could not state the exact amount. Mr. Tomes's criticism was true enough, but it would require six years, instead of six months, to obtain the statistics he asked for. The time was certainly short; still he could form an opinion from the results he had obtained in that time, and he could say that he had been able to do with celluloid what he could not do with any other material.

The PRESIDENT, after thanking Mr. Hunt, Mr. Stevenson, and the other contributors of the evening, in the name of the Society, said that as this was the last meeting of the session, he would wish all the members a pleasant holiday. He would also take the opportunity of stating once more that October 31st would be the last day on which the nominations could be received of practitioners who did not possess a legal qualification. After the amount of publicity which had been given to this law, it would be the individual's own fault if any eligible practitioner found himself shut out from membership. Lastly, he would call upon all who could possibly do so to

attend the meeting of the British Dental Association, which would be held at Liverpool in August. It would be the first meeting out of London, and its success would probably influence that of subsequent meetings. Judging only from the arrangements at present made, he felt sure that those who took the trouble to attend would be repaid for their journey.

The next meeting would take place on Monday, November 6th, when a paper would be read by Dr. Alfred Carpenter; whilst Mr. Charters White had promised to read his at the December meeting.

The meeting was then adjourned.

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